U.S. Department of the Interior
Bureau of Land Management

EAST SOCORRO

Grazing Environmental Statement

DEPARTMENT OF THE INTERIOR

FINAL

ENVIRONMENTAL STATEMENT ON GRAZING MANAGEMENT IN THE EAST SOCORRO ES AREA

PREPARED BY

BUREAU OF LAND MANAGEMENT

DEPARTMENT OF THE INTERIOR

Frank Gregg

DIRECTOR, BUREAU OF LAND MANAGEMENT

SUMMARY

Draft ( ) Final (x) Environmental Statement

1. Type of Action: Administrative (x) Legislative ( )

2. Brief Description of Action: The Bureau of Land Management proposes to initiate an intensive livestock grazing program, (838,808 of public land) through the implementation of 79 allotment management plans (AMPs), on 91 allotments on 788,097 acres of public land; set livestock numbers on 26 non-AMP allotments on 46,142 acres public land; and maintain management of 4,569 acres of public land in no grazing areas in the Socorro District in Socorro and Valencia Counties, New Mexico. This proposal would impact intermingled State and private land within the 91 allotments which would have AMPs. Each AMP would establish the following for each allotment: (1) season of use for livestock, (2) proper livestock grazing use, (3) apportionment of wildlife and wild horse Animal Unit Months (AUMs), (4) allotment and pasture boundaries, and (5) proper grazing treatments.

Forage would be apportioned for livestock (119,465 AUMs), wildlife (4,802 AUMs), and wild horses (384 AUMs). Range developments would be constructed. Along proposed pipelines 48 fenced wildlife waters would be installed. Overall livestock adjustments would average -30 percent, while individual allotments would have a range of adjustments from +47 to -100 percent.

Purposes of the Proposed Action are to enhance the vegetative resource, improve range conditions, reduce erosion, improve water quality, provide quality habitat for wildlife and wild horses, protect archaeological and historical sites, and provide a continuous supply of livestock forage. These goals are taken into account in the development of each AMP.

Proposed grazing systems include rest-rotation for 38 allotments, deferred rotation for 6 allotments, rotational deferment for 14 allotments, rotational seasonal for 9 allotments, continuous seasonal for 8 allotments, and scheduled rest-best for 4 allotments. Fourteen wells and well facilities, 41 storage tanks, 79 troughs, 22 cattleguards, 4 springs, 1 earthen reservoir, 89 miles of pipelines, and 214 miles of fence would be required to implement the proposed grazing systems.

3. Summary of Environmental Impacts: After 20 years under the Proposed Action the existing situation would change as follows: Annual vegetative production (in AUMs) would increase 37 percent to 184,884; annual sediment yield (in acre-feet) would decrease 25 percent; annual runoff would decrease 3 percent; annual livestock production (in Animal Units) would increase 2 percent to 20,529; annual wildlife forage apportioned (in AUMs) would increase 5 percent to 5,041; annual wild horse forage would be determined through a management plan; and annual direct income would increase 2 percent (to $2,552,837) above the existing situation. In order to achieve these benefits rested and deferred pastures would eliminate competition of livestock with wildlife and wild horses for available forage; this would be especially beneficial in big game spring and winter habitat areas. The grazing systems would improve vegetative production, density, cover, and wildlife habitat. Livestock AUMs would be adjusted initially to match the available forage, resulting in a short-term (5 years) loss of approximately 4,266 AUs, 15 jobs and $527,520 annually in lost income. In the short term 6 small operators would be eliminated and operation sizes would decrease as a result of the livestock reductions. In the long term (20 years) 4 of the above small operators would still be eliminated. Because of increased vegetative production and an overall improvement in range condition in the long term operation sizes would generally shift back to the present ranch size categories. All jobs lost would be regained in the long term and income would increase 2 percent above the existing situation. Adverse impacts would include reduced vegetative production on 559 acres over the short term due to construction of range developments. Vegetation around water developments would be lost and localized soil erosion on 178 acres would increase. Fences would create additional barriers to big game.

4. Alternatives Considered:
   a. No Action
   b. Livestock Adjustment
   c. Pasture Capacity Level
   d. Enhancement of Sensitive Resource Values
   e. No Grazing

5. Comments Have Been Requested From the Following: See attached.

6. Date Statement Made Available to EPA and the Public

Draft Statement: March 13, 1979
Final Statement: SEP 07 1979

Comments on the Draft ES were requested from the following agencies and interest groups. Those marked with an asterisk (*) submitted written responses.

FEDERAL AGENCIES

U. S. DEPARTMENT OF AGRICULTURE

Agricultural Stabilization and Conservation Service
Forest Service
*Soil Conservation Service

*ENVIRONMENTAL PROTECTION AGENCY

U. S. DEPARTMENT OF THE INTERIOR

Advisory Council on Historic Preservation
Bureau of Mines
*Bureau of Reclamation
*Fish and Wildlife Service
*Heritage Conservation and Recreation Service
*National Park Service
U. S. Geological Survey

U. S. DEPARTMENT OF THE ARMY

*Corps of Engineers
White Sands Missile Range

LOCAL GOVERNMENTS

City of Socorro
Laguna Planning Commission
*Pueblo de Acoma
Sierra County Commissioners
Socorro County Commissioners
The Navajo Nation
Torrance County Commissioners
Valencia County Commissioners
Village of Magdalena

ENVIRONMENTAL INTEREST GROUPS

Ada County Fish and Game League
*American Horse Protection Association
*Audubon Society
Center for Environmental Research
Central Clearinghouse
Central Rio Grande Soil and Water Conservation District
Friends of the Earth
International Society for the Protection of Mustangs and Burros
Jornada Resource Conservation and Development
National Council of Public Land Users
National Mustang Association
National Wildlife Federation
Natural Resources Defense Council
Nevada Outdoor Recreation Association
New Mexico Association of National Resource Conservation Districts
New Mexico Conservation Coordinating Council
New Mexico Ornithological Society
New Mexico Wilderness Study Committee
Oregon Environmental Council
*Salado Soil and Water Conservation District
Sierra Club
Socorro Soil and Water Conservation District
Southwest New Mexico Resource Conservation and Development
*Spanish Barb Wild Horse Research Farm
Spanish Mustang Registry
Wild Horse Organized Assistance
Wilderness Society

LIVESTOCK INTEREST GROUPS

*New Mexico Farm and Livestock Bureau
*New Mexico Cattle Growers
Public Lands Council
Sierra County Farm Bureau
*West Central Grazing Permittees Association

NEW MEXICO STATE AGENCIES

*Department of Game and Fish
Department of Natural Resources
Division of State Forestry
Environmental Improvement Division
Middle Rio Grande Conservancy District
Middle Rio Grande Council of Governments
*New Mexico State Clearinghouse
*New Mexico Office of the Governor
Southern Rio Grande Council of Governments
State Engineer's Office
State Highway Department
State Historic Preservation Office
State Land Office
State Planning Office

PROFESSIONAL SOCIETIES

Society for Range Management
Soil Conservation Society of America
The Wildlife Society

OTHER GROUPS

Arizona State University
Eastern New Mexico University
Museum of New Mexico
Navajo Tribal Museum
*New Mexico State University
School of American Research
University of New Mexico

INDIVIDUALS

James Morgan
*Jerry Schickedanz
*Livestock Permittees

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MAP ERRATA

Visual B, Vegetation: Bureau of Reclamation lands which are shown as "Waste" should be shown as "Unclassified."

Visual C, Soils: The title should be changed to "Range Sites (Developed from Soils)."

Visual D, Existing and Proposed Developments: A well was omitted from Allotment 328 in SENE Section 25, T. 4 S., R. 3 E.

CHAPTER 1

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

DESCRIPTION OF THE PROPOSED ACTION

PURPOSE AND OBJECTIVES

The purpose of the Proposed Action is to implement a grazing management program based on growth requirements of vegetation. Objectives (for a 20-year period) are to enhance the vegetative resource, improve range conditions, reduce erosion and sedimentation damage, improve water quality, provide quality habitat for wildlife and wild horses, improve the recreation and visual resources, provide a continuous supply of livestock forage, and protect archaeological and historical sites. These objectives are taken into account in the development of each Allotment Management Plan (AMP). Each AMP may be reviewed at the Bureau of Land Management (BLM) Socorro District Office.

SETTING AND LAND STATUS

The Environmental Statement (ES) Area is irregularly shaped and ranges basically northwest and east from the town of Socorro (estimated population 6,000). The area, divided by the Rio Grande, extends as much as 100 miles from north to south and 50 miles from east to west (Map 1-1). Elevations range from 4,500 feet on the lower Rio Grande to 9,176 feet on Ladron Peak. The higher elevations are semiarid while the lower elevations are arid. There is little dependable surface water.

The ES Area is bounded on the south by the White Sands Missile Range, Bosque del Apache National Wildlife Refuge, and Sierra County; it is bounded on the north by the Sevilleta National Wildlife Refuge and the Acoma and Laguna Indian Reservations. The Cibola National Forest and D-Cross Mountain denote the western boundary, and the eastern line runs near Chupadera Mesa. Adjacent communities include Socorro, Magdalena, Belen, and Los Lunas.

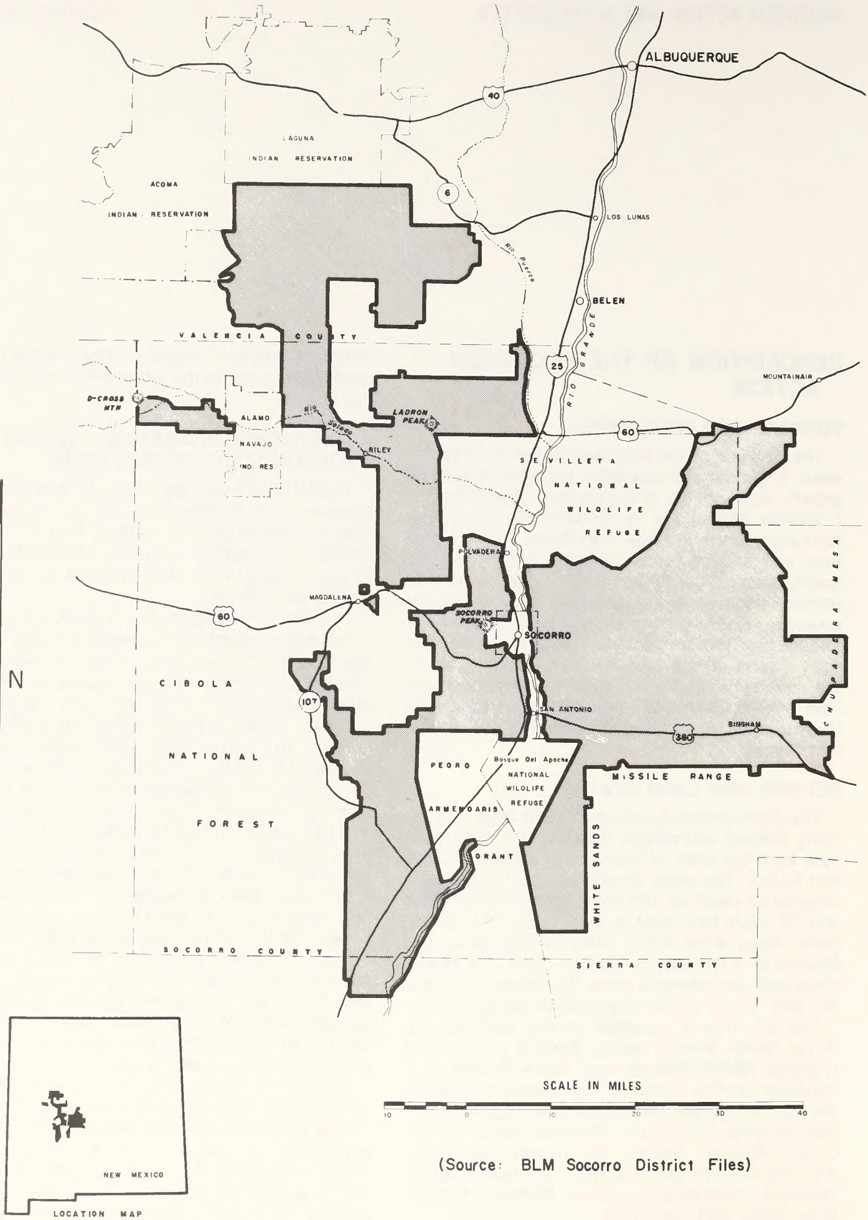
The ES Area covers approximately 1,650,214 acres; 838,808 acres (51 percent) is public land, 293,158 acres is State land (18 percent), 495,196 acres is private land (30 percent), and 23,052 acres is under Bureau of Reclamation (BR) jurisdiction (1 percent) (Visual A). For a more detailed description, refer to the Interrelationship section of this chapter.

ADJUSTMENTS IN GRAZING USE AND PROPOSED UTILIZATION LEVEL

The 91 allotments proposed for intensive management vary in size from 584 to 73,224 acres and in livestock grazing capacity from 17 to 7,649 animal unit months (AUMs). (An AUM is the forage required to sustain one cow or its equivalent for one month.)

The 1975-77 range survey indicates the area is presently overstocked. Appendices 1 and 2 briefly describe the 1975-77 range survey method and, also, the method used to apportion forage to other resources. Livestock are apportioned 119,465 AUMs (71,600 AUMs on public land). Wildlife are apportioned 4,802 AUMs and wild horses 384 AUMs. This capacity rate would allow for 50-percent (moderate) utilization of key species by allotment. The present grazing use is 170,697 AUMs (104,678 AUMs on public land). This indicates an overusage of approximately 30 percent. Adjustments for non-AMP allotments would range from 47 percent to -100 percent. The adjustments in AMP allotments would range from 6 percent to -80 percent. Eight AMP allotments covering 115,994 acres (97,153 acres of public land) would receive no change in existing grazing use. Four AMP allotments totaling 60,196 acres (38,827 acres of public land) and two non-AMP allotments (8,039 acres of public land) would receive increases in grazing use.

Table 1-1 shows the existing and proposed grazing use by grazing system, while Table 1-2 shows proposed livestock adjustments. Both are summaries of Table A-1 (Appendix 1, p. A-1). Table A-2 (Appendix 1, p. A-18) gives the schedule for putting the Proposed Action into effect. An analysis of the 25 existing AMPs was done to determine their adequacy. Of the existing AMPs six would remain unchanged, eleven would have adjustments in FY 1980, and eight would have both adjustments and developments in FY 1980. The unsuccessful AMPs were either overstocked,



(Source: BLM Socorro District Files)

MAP 1-1. East Socorro Grazing Environmental Statement Area

TABLE 1-1

SUMMARY OF PROPOSED ACTION BY GRAZING SYSTEM

Allotments	Type of Grazing System /3	Number	Acres	Existing Grazing Use (In AUMs) Livestock	Existing Grazing Use (In AUMs) Wildlife	Proposed Grazing Use (In AUMs) Livestock	Proposed Grazing Use (In AUMs) Wildlife
AMPs	RR-2	2	27,858	2,929	0	191	46
	RR-3	20	359,969	50,070	433	32,939	1,049
	RR-4	11	188,251	27,472	419	17,219	795
	RR-5	3	122,720	15,161	159	12,924	322
	RR-6	1	27,690	3,228	144	1,762	110
	RR-8	1	30,118	2,705	0	2,705	79
	RR-9	1	21,158	1,500	0	1,500	53
	(Total RR)	(39)	(777,764)	(103,065)	(1,155)	(69,240)	(2,454)
	RB-3	1	73,224	12,384	300	7,649	470
	RB-4	2	57,915	5,954	72	5,110	108
	RB-5	1	46,573	6,899	12	4,640	178
	(Total RB)	(4)	(177,712)	(25,237)	(384)	(17,399)	(756)
	RO-2	8	65,880	6,984	72	5,671	225
	RO-3	5	76,539	9,963	66	9,787	433
	(Total RO)	(13)	(142,419)	(16,947)	(138)	(15,458)	(658)
	CS-1	7	12,641	1,372	111	661	54
	CS-2	1	21,165	2,720	0	1,230	91
	(Total CS)	(8)	(33,806)	(4,092)	(111)	(1,891)	(145)
	RS-2	8	71,966	6,961	16	5,013	323
	RS-4	1	33,092	3,636	24	2,831	65
	(Total RS)	(9)	(105,058)	(10,597)	(40)	(7,844)	(388)
	DR-2	4	15,401	1,608	24	836	43
	DR-3	2	15,276	1,699	0	1,436	113
	(Total DR)	(6)	(30,677)	(3,355)	(24)	(2,272)	(156)
Totals		79	1,267,436	163,293	1,852	114,104	4,557 /1
Non-AMPs		26	46,142 /2	7,292	51	5,361	201
Elimination of Grazing		4	1,987	112	0	0	41
Unallotted		2	2,582	0	0	0	3
Grand Total		111	1,318,147 /4	170,697	1,903	119,465	4,802

/1 384 AUMs not included in this total is set aside for Wild Horses.
/2 Includes only public land on non-AMP areas.
/3 The 3 AMPs having more than one grazing system are listed under the system with the greatest number of AUMs. Numbers following abbreviations indicate the number of pastures in the grazing system.
/4 Does not include 332,067 acres of private and State land in non-AMP areas.

RR - Rest-Rotation; RB - Rest-Best; RO - Rotational Deferment
CS - Continuous Seasonal; DR - Deferred Rotational; RS - Rotational Seasonal

Source: Summary of Table A-1 (Appendix 1, p. A-1)

TABLE 1-2

SUMMARY OF LIVESTOCK ADJUSTMENTS

ALLOTMENTS	TOTAL EXISTING GRAZING USE (AUMs)	+1 to +47	0	NUMBER OF ALLOTMENTS BY PERCENT CHANGE GROUP (IN LIVESTOCK AUMS) -1 to -15	-16 to -30	-31 to -50	-51 to -90	-91 to -100	TOTAL
Number of AMPs		4	8	11	17	20	19	0	79
(AUMs)	(163,293)	(9,737)	(12,153)	(19,458)	(27,445)	(34,070)	(11,241)	(0)	(114,104)
Number of Non-AMPs		2	0	2	5	9	6	2	26
(AUMs)	(7,292)	(1,268)	(0)	(533)	(1,668)	(1,523)	(369)	(0)	(5,361)
Number of Elimination of Grazing		0	0	0	0	0	0	4	4
(AUMs)	(112)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Number of Unallotted Areas		0	2	0	0	0	0	0	2
(AUMs)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Total		6	10	13	22	29	25	6	111
(AUMs)	(170,697)	(11,005)	(12,153)	(19,991)	(29,113)	(35,593)	(11,610)	(0)	(119,465)

Source: Summary of Table A-1 (Appendix 1, p. A-1)

the systems were not meeting resource objectives, and/or the systems were never implemented because of a lack of range developments to fully implement them. Proposed AMPs would have their adjustments completed as follows: 17 in FY 1981, 16 in FY 1982, and 21 in FY 1983 (Table 1-3).

Grazing use would be set at the 1975-77 range survey level. Adjustments would be initiated during the first fiscal year following completion of the final ES. In an effort to reduce probable hardship livestock adjustments would be applied as follows:

1. Reductions of 15 percent or less and all increases would become effective the first year.
2. Reductions of 16 to 30 percent would be taken in two equal portions over 2 years.
3. Reductions of 31 percent or more would be in three equal portions over 3 years.

Apportionment of the predicted vegetative increases must be done through the BLM Planning Systems. The projected increases in vegetation would be distributed through guidelines set during the next update of the Management Framework Plan (MFP). Increases in vegetative production would be apportioned based on the needs of all the resources.

ALLOTMENT MANAGEMENT PLAN AREAS

Seventy-nine (79) AMPs would be implemented on 91 allotments with the Proposed Action (Visual A). These allotments include a total of 1,267,436 acres. These AMPs contain the grazing systems most suitable to a given allotment. Thus, they prescribe the conditions, manner, and extent of livestock grazing and describe type, location, ownership, and general installation and maintenance specifications for range developments (Federal Land Policy and Management Act, 1976). AMPs may be reviewed in the BLM Socorro District Office.

Grazing Systems

A Grazing system is the manipulation of animals to accomplish a desired result. The systems aim at improving 1) forage production which can be increased by changing botanical composition, increasing vigor, and stimulating growth, and 2) livestock production and performance which can be achieved without site deterioration by obtaining better livestock distribution (Cook, 1966; Shiflet and Heady, 1977; and Heady, 1961).

Various systems have been developed that are geared to the growth requirements of forage in specific areas. Periodic rest from grazing is usually provided through pasture rotation to permit plants to regain vigor, produce seed, reproduce vegetatively through seed dissemination and seedling establishment, and to allow for litter accumulation to protect the soil surface. Typical schematics for each of the proposed grazing systems are in Appendix 1 (Figure A-6, p. A-17).

Six grazing systems tailored to specific conditions are proposed in the ES Area. They are as follows:

1. Systems Allowing Grazing on Allotment Year-Round

Rest-Rotation -- One or more pastures are usually rested yearlong on a rotational schedule. Another pasture often is scheduled for rest during the growing season, July through October. Yearlong rest allows plants the opportunity to regain vigor, produce seed, and reproduce through seed dissemination and seedling establishment. Yearlong rest allows litter to accumulate (Hormay, 1970).

This type of system was proposed on allotments where browse species such as mountain mahogany, saltbush, and winterfat are key species. It was also proposed on allotments where black grama is the more important key grass species. Also, where cool season species have been depleted and where key species vigor needs improvement, rest-rotation systems were proposed.

This system would allow browse the 16-month rest period that they need to improve vigor and complete their reproductive cycle. Black grama, which reproduces mainly vegetatively, would be afforded the opportunity to complete its reproduction cycle during the 16-month rest period. Stolons would be produced one growing season; the winter rest would leave the stolons undisturbed; then the rest period the following growing season would allow the stolons to take root and become firmly established.

The type of rest-rotation systems proposed also allows for rest and seed production by cool season species. Also, where plant vigor is low, the rest periods proposed will allow the key species to produce and store food; therefore, improving the general health or vigor of these species. Rest-rotation systems are proposed for 39 allotments including 777,764 acres.

Scheduled Rest-Best -- One or more pastures are rested yearlong on a flexible rotation basis rather than on a fixed rest schedule. The system is flexible in that the rancher and BLM mutually select and agree on which pastures are to be rested.

This system was selected for allotments where the same conditions as previously discussed under rest-rotation systems exist. In addition to the reasons discussed, the scheduled rest-best system was proposed for large and very large allotments that have topographic features that create different moisture - vegetative conditions.

TABLE 1-3

SUMMARY OF AMP IMPLEMENTATION SCHEDULE

	FY 80			FY 81			FY 82			FY 83		
	Allot.	AUMs	Acres	Allot.	AUMs	Acres	Allot.	AUMs	Acres	Allot.	AUMs	Acres
	036 1/	1,200	12,096	006 5/	1,478	13,731	012 5/	65	2,729	002 5/	2,632	48,523
	058 2/	534	4,577	016 5/	2,254	25,837	114 5/	4,640	46,573	037 5/	1,352	14,076
	059 2/	1,762	27,690	083 4/	64	634	152 5/	2,856	32,078	052 4/	78	2,096
	065 3/	2,831	33,092	086 4/	2,832	27,882	251 5/	2,295	17,196	089 4/	43	644
	077 2/	191	6,573	258 5/	965	12,871	252 5/	1,684	21,285	090 4/	959	13,899
	081 1/	948	6,189	263 5/	1,893	21,600	262 5/	2,105	23,399	131 5/	814	10,940
	091 2/	478	7,474	264 5/	1,146	10,640	266 5/	1,282	13,517	250 5/	515	17,970
	121 3/	848	9,708	272 5/	4,206	22,622	271 5/	2,816	20,155	260 5/	1,678	18,395
	122 2/	310	5,417	285 5/	2,226	27,875	276 4/	310	3,040	268 5/	2,529	35,895
	129 3/	6,340	72,345	290 5/	2,287	12,726	277 4/	1,691	26,692	275 5/	7,649	73,224
	253 2/	204	3,117	293 5/	6,106	42,901	291 5/	1,199	10,626	280 5/	1,518	18,029
	254 3/	1,764	25,163	294 4/	1,332	11,531	303 5/	78	707	284 5/	1,050	11,662
	255 3/	284	6,127	299 5/	413	12,934	330 5/	940	8,124	295 4/	1,230	21,165
	256 2/	1,474	15,787	322 5/	1,900	17,566	347 4/	17	584	298 5/	801	7,516
	261 1/	2,705	30,118	323 4/	1,912	13,317	348 5/	146	2,358	301 5/	3,559	31,703
	279 1/	1,500	21,158	328 5/	1,013	6,410	349 5/	81	1,315	306 5/	244	6,160
	283 3/	1,740	22,860	360 4/	628	4,382				308 5/	161	5,527
	287 2/	186	5,114							315 4/	68	4,328
	288 3/	241	5,302							321 4/	843	11,573
	289 1/	1,620	10,670							325 5/	1,485	13,866
	297 2/	452	19,996							327 5/	971	11,813
	300 1/	720	3,499									
	312 3/	337	9,450									
	317 2/	104	3,745									
	318 2/	292	5,328									
Total AUMs (114,104)		29,065			32,655			22,205			30,179	
Total Acres (1,267,436)			372,595			285,459			230,378			379,004
Number of Allotments (79)	25			17			16			21		

1/ Existing AMPs without Adjustments or Developments
2/ Existing AMPs with Adjustments Only
3/ Existing AMPs with Adjustments and Developments
4/ Proposed AMPs with Adjustments Only
5/ Proposed AMPs with Adjustments and Developments

Source: Summary of Tables A-1 (Appendix 1, p. A-1), A-2 (Appendix 1, p. A-18)

This system is very compatible with Valentine's (1967) 'seasonal suitability' and Herbel, Steger, and Gould (1974), and Herbel's (1971) 'best pasture' system, which is the grazing system supported by research from the Jornada Experimental Range. This system is proposed on 4 allotments totaling 177,712 acres.

Rotational Deferment -- Every pasture is grazed once or twice annually with each pasture receiving a full growing season rest on a rotational basis. Rest during growing seasons is rotated among pastures, and the system is quite similar to deferred rotation. This system was proposed on allotments where additional expenditures beyond what is in the Proposed Action for range developments would not be cost effective through a benefit/cost analysis. This system provides rest during the growing season, and allows for breaking up a pattern of continuous use. Although longer rest periods would have been desirable, these rest periods do provide for rest to improve vigor on smaller allotments where resource values are not critical and the benefit/cost limits pasture numbers. This system is proposed on 13 allotments totaling 142,419 acres.

Deferred Rotation -- Every pasture is grazed once or twice annually with each pasture receiving a partial, deferred growing season rest. This system was proposed on allotments where additional expenditures beyond what is in the Proposed Action for range developments would not be cost effective through a benefit/cost analysis. This system provides a partial growing season rest which will allow for a breaking up of continuous yearlong use. This system is very similar to the rotational deferment systems proposed; however, the smaller size of the allotments this system was proposed for limited the rest period that could be provided. This system is proposed on 6 allotments totaling 30,677 acres.

2. Systems Restricting Grazing on an Allotment to a Specific Season

Rotational Seasonal -- One pasture is used during a season of the year while the other pasture is rested for up to 16 months. These small two-pasture allotments generally have less than ideal plant specie composition and cover. Black grama, the most important forage plant, is generally low in vigor and only remote stands are present. In order to improve these conditions a long rest period (16 months) is needed to allow black grama to produce stolons and reproduce vegetatively. The rotational seasonal system was proposed on 9 allotments totaling 105,058 acres because it provided the needed 16-month rest period as well as rest for improved plant vigor. Three of these allotments are presently being grazed seasonally.

Continuous Seasonal -- The allotment is used during a specified season. The systems proposed do not allow the allotment to be grazed for more than two successive growing seasons. This system takes into account special resource values or problems on generally small allotments.

Some of the special resource needs or problems met through the implementation of this type of system on these allotments include: winter rest where needed to provide deer with a winter use area free from competition with livestock; winter use by livestock in a pasture that provides them some protection from the elements; use of a pasture by livestock during a season when water is available. This system is proposed on all or part of 8 allotments totaling 33,806 acres.

Range Developments

Construction of range developments would be required for the implementation of the proposed AMPs. These developments are: springs, pipelines, wells, fenced wildlife waters, troughs, fences, cattleguards, storage tanks, well facilities, and an earthen reservoir (Visual D).

All developments are designed by the BLM district engineer to fit the situation for the particular area; however, these are, for the most part, standard throughout BLM. The details of how the developments are constructed may be reviewed in the BLM Socorro District Office.

Developments related to this proposal are shown by allotment in Appendix 1 (Table A-2, p. A-18). A summary of these developments is found in Table 1-4.

Before any proposed development or action is implemented on public land, BLM must adhere to certain procedures and design specifications to protect all resources. This is mandated through certain laws, executive orders, and manual requirements.

Project Design Features

Design features for construction of the proposed range developments are as follows:

1. Roads or trails would be constructed only where existing roads and trails could not be used (BLM policy).

2. Archaeological clearance would be required for each project site before construction. If any archaeological resources are encountered during construction, operations will cease at the discovery site and a professional archaeologist will be consulted as to the significance of the material (BLM policy; National Historic Preservation Act of 1966; National Environmental Policy Act of 1969; Executive Order 11593; 36 CFR 800).

TABLE 1-4

PROPOSED RANGE DEVELOPMENTS AND ACREAGE DISTURBED BY CONSTRUCTION /1

Range Developments	Units	PA/PCL Total Units	PA/PCL ST	PA/PCL LT	NA/FE/LA Total Units	NA/FE/LA ST	NA/FE/LA LT	ESR Total Units	ESR ST	ESR LT	NG Total Units	NG ST	NG LT
Fences /2	mi.	214.2	214.2	42.8	13.8	13.8	2.76	241.2	241.0	48.2	1,475.0	1,475.0	295.0
Cattleguards	ea.	22.0	1.3	1.3	0	0	0	22.0	1.3	1.3	0	0	0
Wells	ea.	14.0	7.0	1.4	3.0	1.5	0.30	14.0	7.0	1.4	0	0	0
Well Facilities	ea.	14.0	0	0	3.0	0	0	14.0	0	0	0	0	0
Springs	ea.	4.0	0.8	0.2	1.0	0.2	0.05	4.0	0.8	0.2	0	0	0
Pipelines /2	mi.	88.7	133.1	88.7	17.4	26.1	17.40	88.7	133.1	88.7	0	0	0
Storage Tanks	ea.	41.0	20.5	4.1	14.0	2.8	1.40	41.0	20.5	4.1	0	0	0
Troughs /3	ea.	79.0	197.5	197.5	18.0	45.0	45.00	79.0	197.5	197.5	0	0	0
Wildlife Waters/Fenced	ea.	48.0	4.8	2.4	9.0	0.9	0.45	48.0	4.8	2.4	0	0	0
Earthen Reservoirs	ea.	1.0	1.0	0.5	0	0	0	1.0	1.0	0.5	0	0	0
TOTAL			580.2	338.9		90.3	67.36		607.0	344.3		1,475.0	295.0

/1 Summary of Table A-2 (Appendix 1, p. A-18)

/2 Disturbance relating to fences and pipelines includes roads

/3 Disturbance relating to troughs includes sacrifice areas (2.5 acres per trough)

ST = Short Term (Five years or less)

LT = Long Term (Twenty years)

PA = Proposed Action
LA = Livestock Adjustment Alternative
NG = No Grazing Alternative
PCL = Pasture Capacity Level Alternative
ESR = Enhancement of Sensitive Resource Values Alternative
NA/FE = No Action Alternative and Future Environment

Source: Summary of Table A-2 (Appendix 1, p. A-18)

3. Threatened or Endangered species survey and clearance would be required for each project site before construction (Endangered Species Act and BLM Manual 6840).

4. Disturbance of soil and vegetation at all project sites would be held to an absolute minimum (BLM policy; BLM Manual 6300).

5. Areas where the soils would be disturbed would be restored to blend into the surrounding soil surface (BLM policy; BLM Manual 6300).

6. Visual resources contrast ratings would be completed in the survey and design stage of all proposed developments (BLM policy; BLM Manual 6300), and appropriate mitigating measures would be implemented to meet the Visual Resource Management (VRM) class objectives for the area in which the action is located.

7. All storage tanks would be buried when feasible.

8. Soil maps and the watershed specialist would be consulted for on-site investigations to determine areas of least impact, i.e., avoid soils on steep slopes and soils in the critical and severe erosion condition classes.

9. Construction of all fences would be in accordance with design constraints in BLM Manual 1737.

10. Water would be provided in rested pastures for wildlife and wild horse use in accordance with BLM policy.

11. No action would be taken in roadless areas determined to have wilderness characteristics until the complete wilderness inventory and study required by Section 603 of the Federal Land Policy and Management Act of 1976 (FLPMA) is completed and Congress has acted. No action would be taken which would impair the suitability of such areas for preservation as wilderness.

12. Before construction BLM would prepare a site specific environmental assessment to analyze environmental impacts.

Maintenance of range developments on public lands is subject to policy and guidance contained in BLM Manual Section 7120. Fences and cattleguards built primarily for livestock management would be maintained by allottees under agreements complying with BLM guidelines.

BLM would maintain all BLM-owned water developments. Allottees' obligations would be limited to periodic inspections and reporting of damage or malfunction. BLM would develop a schedule for inspection and maintenance sufficient to meet these intervals: fences and cattleguards, 5 years; earthen reservoir, 3 years; springs, well facilities, pipelines, and wildlife waters, annually. Adjustments in maintenance schedules would be made as needed for individual projects.

Benefit/Cost Analysis

An economic analysis has been done for every AMP. These analyses are intended to provide a general picture of the cost effectiveness of the AMPs. The major criteria for determining benefit/cost (B/C) ratios are as follows: wildlife, recreation, watershed, and livestock production benefits versus BLM and rancher costs. Some of the range developments originally proposed had to be eliminated; and, as a result, some grazing systems had to be changed. This made the AMPs more cost effective (e.g., B/C ratio of 1 to 1 or higher). Therefore, only those developments considered necessary for the implementation of each AMP are proposed. Seventy-two (72) proposed AMPs have a B/C ratio of .98/1 or higher while the remaining seven have B/C ratios that range from .31/1 to .63/1. One of these seven allotments is large and has few range developments. In order to implement the proposed grazing system several new projects are needed. The B/C ratio for this allotment is .63/1. The other six allotments, with less than 1 to 1 B/C ratios, are small allotments with few developments and yearlong continuous use. In order to improve the existing poor and fair range conditions of the six allotments rotational grazing systems have been proposed on these allotments. The introduction of new developments to initiate grazing systems results in a B/C ratio of less than 1 to 1. The B/C analyses for each AMP may be reviewed at the Socorro District Office.

Allotment Evaluation

As AMPs are implemented, studies would be initiated according to BLM Manual 4413. All AMPs would be evaluated at the end of each grazing cycle as provided for in BLM Manual 4413 and each AMP. These studies would focus on actual livestock grazing use, forage utilization, range condition trends, and climatic conditions. Data on wildlife and other resources would be collected. Where objectives are not being met, the AMP would be modified. Such modifications could include changes in the grazing use, season of use, additional range developments, or any combination of these in order to attain the objectives. AMP modifications would require preparation of an environmental assessment record (EAR) or a supplement to this ES before significant change could be effected.

Flexibility

Flexiblity in grazing systems is desirable for two reasons: to guard against damage to the vegetative/soil resource by holding to a preestablished formula regardless of changing climate conditions and to avoid imposing a major economic hardship on the range user by forcing him to alternately dispose of and then acquire livestock in response to short-term changes in climatic conditions.

Any flexibility in the above grazing system will be based on variations in the phenological development of the identified key vegetative species. The flexibility will be restricted seven days on either side of the move in or out date of pastures designated for use in accordance with the grazing plan. Any additional flexibility will be cooperatively agreed upon by both the allottee and District personnel after both parties mutually inspect the allotment. In no case will utilization be allowed to exceed an average of 70 percent in the pasture scheduled for grazing. Any deviation from the grazing schedule must receive BLM's prior approval. Achieving AMP multiple-use objectives will be the primary concern in the consideration of any changes in the grazing schedule.

During periods of drought or other emergencies, adjustments in livestock numbers would be made to guard against damage to the vegetal- soil resource. In instances where adjustments are needed, the operator will be contacted and where possible adjustments would be jointly agreed to. If an agreement cannot be reached, then the needed adjustment would be put into effect by decision.

Because of the variability in forage production, some deviation from the grazing schedule may be necessary. It is anticipated that more flexibility will be required during the first grazing cycle concurrent with range studies designed to monitor stocking rates and range conditions. As final stocking rates are determined and range condition improves, it is anticipated that less deviation from the grazing schedules will be necessary.

NON-AMP ALLOTMENTS

AMPs are not proposed for 26 allotments encompassing 46,142 acres of public land (Table A-1, Appendix 1, p. A-1). Most of the land in these allotments is State or private (Visual A). In 1975-77 a range survey was conducted on the public land in the non-AMP allotments. All of the public land is in fair or higher range condition class. The grazing preference on public land would be adjusted according to the range survey (Appendices 1 and 2). Livestock adjustments average -27 percent and would range from a decrease of 100 percent to an increase of 47 percent for an overall reduction of 1,940 AUMs (Table A-1, Appendix 1, p. A-1). Thus, as directed by FLPMA Section 402(e), on public land BLM would specify the kind and number of livestock, the season of use, length of permit, and any other provisions necessary to prevent deterioration of public resources. In non-AMP allotments BLM would conduct studies on public land to monitor range condition and trend. If range condition and/or trend is declining, action would be taken to reduce grazing preference.

ELIMINATION OF GRAZING ALLOTMENTS

Elimination of livestock grazing is proposed for 4 allotments totaling 1,987 acres. These allotments are comprised totally of public land as is shown in Table A-1 (Appendix 1, p. A-1) and Visual A. Three of the four allotments have insufficient forage for livestock grazing. One allotment (1,127 acres) is proposed to be set aside for wildlife and enhancement of the scenic geologic quality of the San Lorenzo Canyon Area (VRM Class II).

UNALLOTTED ALLOTMENTS

Two allotments composed of small, scattered tracts of public land totaling 2,582 acres are deemed unsuitable for grazing and have never been allotted. These are shown in Table A-1 (Appendix 1, p. A-1) and Visual A.

IMPLEMENTATION

As adjustments are completed on a proposed AMP allotment, its AMP would be implemented in the next fiscal year (Table 1-3). All scheduled range developments for that allotment would be constructed before the scheduled implementation (Appendix 1, Table A-2, p. A-18).

MANPOWER REQUIREMENTS

The Proposed Action would require additional personnel on the BLM Socorro District staff. An increase of personnel above the 1976 staffing level would be necessary to conduct engineering surveys for design, construction, and maintenance of range developments and adequate AMP supervision.

Four additional engineering technicians would be employed to survey, design, prepare contracts, and supervise range development construction. On completion of construction, these positions would be incorporated into a crew to maintain all district developments. At least 14 range related positions are needed to implement and supervise the existing and proposed AMPs beginning in fiscal year 1980. These positions would remain on

the staff to supervise AMPs and help evaluate or revise AMPs as necessary.

INTERRELATIONSHIPS

Formulation of the Proposed Action

The Proposed Action is an outgrowth of BLM's planning process which, among other things, seeks to fulfill BLM's obligations to manage public lands so they serve a variety of purposes. Federal policy directs that the following resource values receive consideration: watershed, wildlife, wild horses, recreation (including scenic), wilderness, and cultural (these are in addition to livestock grazing). (For details on BLM's multiple use planning system see the Final Environmental Impact Statement on Livestock Grazing Management on Public Lands, USDI, December 31, 1974, and BLM Manuals 1601-1608.)

The planning process begins with an inventory of basic resources known as Unit Resource Analysis (URA) and progresses through the management decisions developed in the MFP. Basic resource data for the area are contained in the Stallion URA, 1975, and the Ladron URA, 1976. Management decisions and directions are contained in the Stallion MFP, 1976, the Ladron MFP, 1977. These documents may be reviewed in their entirety at the BLM Socorro District Office. The livestock portions of these MFPs are summarized in Appendix 1, Table A-3, p. A-24.

The MFPs provide guidance and direction for development of action plans -- known as Activity Plans in BLM procedure -- for the specific public resources involved. In the current proposal AMPs are the activity plans for range management.

Other BLM Programs

Section 603 of FLPMA directs BLM to complete a wilderness inventory. The first phase involves identification of roadless areas (a contiguous tract of public land that is 5,000 acres or greater). BLM policy directs that no action would be taken which would impair the suitability of such areas for preservation as wilderness.

Private and State Land

State and private land comprise 788,354 acres (48 percent) of the ES Area. Ninety-one (91) allotments covered by 79 AMPs contain 45 percent of the total State and private land, or 356,284 acres. Twenty-six (26) allotments consisting mostly of State and private land would not be covered by AMPs.

BLM would influence management of and set the grazing capacity on unfenced, intermingled private and State land on those allotments with AMPs as stated in FLPMA. Section 402(f) states in part: 'Allotment Management Plans shall not refer to livestock operations or range improvements on non-Federal lands except where the non-Federal lands are intermingled with, or, with the consent of the permittee or lessee involved, associated with, the Federal lands subject to the plan. The secretary concerned under appropriate regulations shall grant to lessees and permittees the right of appeal from decisions which specify the terms and conditions of allotment management plans. The preceding sentence of this subsection shall be construed as limiting any other right of appeal from decisions of such officials.'

BLM issues two types of authorizations for recognizing capacity of privately controlled lands. These are exchange-of-use agreements and percentage on and off licenses. Exchange-of-use agreements must be filed by the operator and approved by the District Manager. The agreements may be issued for periods not to exceed 10 years. Such agreements may be issued to applicants owning or having control of non-public lands that are interspersed with and normally grazed in conjunction with public lands, not to exceed the grazing capacity of such non-public lands. During the term of the agreement BLM manages grazing on these non-public lands. Percentage on and off licenses are issued and generally restricted to allotments that are used and controlled by one operator. BLM determines the proper stocking rate for all lands within the allotment. The operator is billed only for the grazing capacity of the public lands.

Federal Programs

Forest Service

Three segments of the Cibola National Forest are adjacent to or surround the ES Area. Fourteen allotments border Forest Service (FS) lands, with eight allottees holding Forest Service grazing permits. Two allottees, who operate within allotment 268, have informally incorporated their FS permits with their BLM allotment to form an integrated unit. The other six allottees (allotments 016, 290, 294, 295, 321, and 323) use their FS permits independently of their BLM allotments. About three miles of unfenced boundaries between BLM and FS administered lands exist on two allotments.

Proposed AMPs are coordinated under a national level agreement on resource planning where adjacent lands are administered by the FS and BLM. No major conflicts exist between the present Cibola National Forest grazing management and the BLM Proposed Action.

Soil Conservation Service

The Soil Conservation Service (SCS) provides technical assistance to farmers and ranchers who wish to improve their private and State leased lands. They develop resource conservation plans and provide technical support in planning, surveying, and designing, projects.

In the ES Area, the BLM and SCS operate under a State Cooperative Agreement in developing conservation management plans on intermingled, private, State and public land. SCS may be designated as the lead planning agency, when mutually agreeable, on those ranch units having predominantly private and State land. Where public lands predominate, BLM will normally take the lead in management planning. In some situations plans may be developed jointly. In all situations they will be coordinated plans.

The Soil Conservation Service (SCS) has developed and continues to cooperate with BLM in developing soil surveys.

Fish and Wildlife Service

Under the Endangered Species Act of 1973 (PC 93-205), the Fish and Wildlife Coordination Act, as amended (PL 85-624, 72 Stat. 563, 16 UCS 661), and animal damage control programs, the Fish and Wildlife Service (FWS) has responsibilities to cooperate with other Federal and State agencies in relation to wildlife.

FWS has primary responsibility for control of predatory animals and rodents on public lands when damage to other resources by these animals can be shown and documented. FWS handles reports of animal damage or predation, compiles records, and carries out animal damage control practices on areas that have been authorized by BLM.

On May 23, 1978 BLM requested formal consultation with the FWS as provided by Section 7 of the Endangered Species Act of 1973. Regulations governing interagency consultation (43 CFR 870-876) require Federal agencies to enter into formal consultation if it is determined a Federal action would or may affect endangered or threatened species or their habitat.

Endangered species inhabiting or historically occurring in the area include the bald eagle (*Haliaeetus leucocephalus*), black-footed ferret (*Mustela nigripes*), peregrine falcon (*Falco peregrinus anatum*), Socorro isopod (*Exosphaeroma thermophilum*), and whooping crane (*Grus americana*).

On July 28, 1978 the FWS responded to BLM's consultation request and their general findings are as follows: It is the biological opinion of the Fish and Wildlife Service that the Proposed Action is not likely to jeopardize the continued existence of these species nor adversely modify habitat essential to their survival. Although there are presently no officially listed threatened and endangered plants in the ES Area, there are at least two species proposed for listing as endangered: *Petalostemum scariosum* and *Silene plankii*. Species formally proposed for listing have no legal status under the Endangered Species Act. However, if these species do become officially listed at any time, BLM would be required to manage these plants as required by law.

Bureau of Indian Affairs

The Bureau of Indian Affairs (BIA) administers land use programs in cooperation with Indian pueblos and tribes in the area. There are no Indian free-use allotments in the ES Area. The Acoma, Laguna, Isleta, and Alamo Reservations adjoin the area.

Potential conflicts between the reservations and BLM management programs are mainly related to Laguna livestock trailing across public lands. This occurs twice yearly when sheep are moved to winter or summer grazing areas. The MFP directs BLM to develop a trailing permit and road maintenance agreement with the Lagunas to minimize resource damage.

Bureau of Reclamation

BR is responsible for water control and management along the Rio Grande. There are approximately 23,052 acres of withdrawn land in the ES Area under BR jurisdiction.

BLM administers livestock grazing on this land under national and local cooperative agreements with BR. Six allotments (250, 261, 272, 277, 279, and 288) contain BR lands which are often important to the total ranch operation in that they provide significant amounts of grazing during certain seasons.

BLM has an agreement with BR for wildlife habitat management on 680 acres of withdrawn land in the Elephant Butte Marsh area. This area contains valuable habitat for important species (discussed in Chapter 2, Wildlife). The Stallion MFP provides guidance for efforts to minimize conflict between livestock grazing and wildlife habitat in the Marsh.

BR plans for phreatophyte control within the Middle Rio Grande Project Area could have impacts on livestock grazing on BR lands administered by BLM. Grazing could be curtailed for an indefinite period of time until regrowth of desirable vegetative species. The BR estimates that 3,825 acres of the 23,052 acres would be cleared of vegetation (Final ES, USDI, BR, 1977). Phreatophytes would be controlled by various

mechanical, chemical, and burning methods. During this period of disturbance grazing systems could be disrupted as pastures normally used within the cycle could undergo undetermined periods of rest. This could cause a reduction of up to 366 AUs each year until the control program is completed.

Department of the Army

The Department of the Army has a large area adjacent to the ES Area which is withdrawn as a missile and weapons test and research facility known as White Sands Missile Range. This area is primarily used for defense purposes. The Missile Range has a 52-mile common boundary with BLM, private, and State land along the southeastern corner of the ES Area. Access to the range is restricted, and livestock grazing is prohibited by law.

Grazing does occur, by agreement among the Corps of Engineers, BLM, and livestock operators, in the White Sands Missile Range Extension and safety areas adjacent to the range itself. These are extensions from the Missile Range for safety purposes during firing exercises. Residents are evacuated and access restricted during firing periods (usually averaging about 40 days per year).

These firings could affect the Proposed Action by restricting BLM employees' access. This is not expected to be significant due to the short duration and low frequency of the firing periods. Usually they last one day or less and occur only two or three times per month.

The Corps of Engineers has made several studies related to building flood control projects on the Rio Salado and Rio Puerco in the ES Area. These construction proposals would involve large dams to trap sediment and decrease downstream flood and sediment damages along the Rio Grande.

State Programs

New Mexico State Land Office

There are approximately 293,158 acres owned by the State and administered by the State Land Office (18 percent of the land in the ES Area).

These lands are leased to permittees for livestock grazing and, in most instances, are intermingled with public and private lands. The lessee is considered responsible for these lands and controls public access and use except during the hunting season. The State also issues oil, gas, and geothermal leases on its lands.

The proposed intensive livestock management program would have a direct effect on unfenced, intermingled State lands; in that, if BLM sets the grazing capacity of intermingled State lands below what the State recognizes as the proper capacity, then the State lessee may request an adjustment in recognized capacity for his State lands.

Also, the State Land Office has indicated that they cannot agree to incorporate State lands into BLM AMPs at this time. This could create problems when BLM starts to implement the proposed AMPs. The establishment of an effective working relationship with the State Land Office would be required to help reduce problems associated with the proposed management of the public lands within the ES Area.

New Mexico Department of Game and Fish

The New Mexico Department of Game and Fish (NMDG&F) is responsible for fish and wildlife management within the ES Area. BLM is responsible for fish and wildlife habitat management on public lands, while NMDG&F manages actual populations. This requires close coordination. Much of the information used to determine present and estimated future wildlife numbers was supplied by NMDG&F.

Local Programs

Few local programs are directly related to the Proposed Action. The Soil and Water Conservation Districts work with landowners through the SCS and Agricultural Stabilization and Conservation Service on conservation measures for farms and ranches. Resource plans developed by SCS are affected by proposed management programs on public lands, and the reverse is also true.

The ES Area lies mainly in Socorro and Valencia Counties. It appears there would be little conflict with county planning or zoning controls.

DESCRIPTION OF THE ALTERNATIVES

INTRODUCTION

There are five alternatives to the Proposed Action. They are No Action, Livestock Adjustment, Pasture Capacity Level, Enhancement of Sensitive Resource Values, and No Grazing. The same type of grazing systems were proposed for the Proposed Action, Pasture Capacity Level and Enhancement of Sensitive Resource Values Alternatives. A summary of the key elements for the Proposed Action and each alternative is shown in Table 1-5.

The 123 existing allotments (25 AMPs, 96 non-AMPs, and 2 unallotted allotments) are considered in each of the alternatives. For comparison, impacts of all alternatives are projected for 20 years as in the analysis of the Proposed Action. To provide a basis of comparison impacts of the alternatives are presented with the Proposed Action in the Resource Analysis Chapter. The impact analysis of the alternatives includes the same acreage as in the Proposed Action.

NO ACTION

Under the No Action Alternative the proposed grazing use would be set at 159,025 AUMs. This results in a 7-percent reduction from the existing grazing use. There would be 2,362 AUMs apportioned for wildlife and 384 AUMs for wild horses. Implementation would entail the following:

1. Adjustments would be made on 19 of the existing 25 AMP allotments (Appendix 1, Table A-1, p. A-1) so that forage utilization on existing AMPs would not exceed 50 percent. Ninety-six (96) allotments would not be adjusted and would continue to have heavy forage utilization (60 to 80 percent).
2. The 25 existing AMPs totaling 372,595 acres (259,531 acres of public land) would be intensively managed, while 96 non-AMP allotments totaling 942,970 acres (576,695 acres of public land) and 2 unallotted allotments consisting of 2,582 acres (all public land) would be managed as they are at present.
3. Range developments are not required for 17 of the 25 existing AMPs. Range developments to be completed on the remaining 8 existing AMPs (065, 121, 129, 254, 255, 283, 288, and 312) are as follows: fences, 14 miles; wells, 3 each; pipeline, 17 miles; troughs, 18 each; storage tanks, 14 each; springs, 1 each; well facilities, 3 each; and wildlife waters, 9 each (Appendix 1, Table A-2, p. A-18). Acres disturbed by range development construction are shown in Table 1-4.

LIVESTOCK ADJUSTMENT

Under the Livestock Adjustment Alternative no new AMPs would be implemented. The proposed grazing use would be set at 119,465 AUMs. This results in a 30-percent reduction from the existing grazing use. There would be 4,802 AUMs apportioned for wildlife and 384 for wild horses. Implementation would entail the following:

1. Adjustments on all AMP allotments would be made to balance forage use with forage production in accordance with the 1975-77 BLM Range Survey. This allows 50-percent utilization by allotment (Appendix 1, Table A-1, p. A-1).
2. The 25 existing AMPs totaling 372,595 acres (259,531 acres of public land) would be intensively managed while 92 non-AMP allotments totaling 940,983 acres (574,708 acres of public land), 4 elimination of grazing allotments totaling 1,987 acres (all public land), and 2 unallotted allotments consisting of 2,582 acres (all public land) would be managed as they are at present.
3. Range developments would be the same as in the No Action Alternative. Acres disturbed by range development construction are shown in Table 1- 4.

MANAGEMENT AT PASTURE CAPACITY LEVEL

Under the Pasture Capacity Level Alternative the same grazing systems would be used as outlined in the Proposed Action. The proposed grazing use would be set at 97,036 AUMs. This results in a 43-percent reduction from the existing grazing use. There would be 4,802 AUMs apportioned for

TABLE 1-5

Summary of Key Elements
for the Proposed Action and Alternatives

	EE			PA			NA/FE		
	No. AMPs	Acres	AUMs	No. AMPs	Acres	AUMs	No. AMPs	Acres	AUMs
AMPs									
Rest-Rotation	10	237,477	25,762	39	777,764	69,240	14	265,905	21,467
Rest Best		0	0	4	177,712	17,399		0	0
Rotational Deferment	1	4,577	756	13	142,419	15,458	4	45,575	3,430
Continuous Seasonal		0	0	8	33,806	1,891		0	0
Rotational Seasonal	1	5,328	384	9	105,058	7,844	4	48,836	3,550
Oeferred Rotation	13	125,213	13,835	6	30,677	2,272	3	12,279	618
SUB TOTAL	25	372,595	40,737	79	1,267,436	114,104	25	372,595	29,065
Non-AMPs	96	942,970	129,848	26	46,142	5,361	96	942,970	129,848
Elimination of Grazing	0	0	112	4	1,987	0	0	0	112
Unallotted	2	2,582	0	2	2,582	0	2	2,582	0
GRAND TOTAL	123	1,318,147	170,697	111	1,318,147	119,465	123	1,318,147	159,025
Other AUMs									
Wildlife			1,903			4,802			2,362
Wild Horses			0			384			384
Range Developments									
Fences (Miles)		1,524			214			14	
Wells		214			14			3	
Well Facilities		214			14			3	
Pipelines (Miles)		276			89			17	
Storage Tanks		44			41			14	
Troughs		349			79			18	
Wildlife Waters/Fenced		46			48			9	
Cattleguards		28			22			0	
Springs		59			4			1	
Earthen Reservoirs		331			1			0	

	LA			PCL			ESR			NG		
	No. AMPs	Acres	AUMs	No. AMPs	Acres	AUMs	No. AMPs	Acres	AMPs	No. AMPs	Acres	AUMs
AMPs												
Rest-Rotation	14	265,905	21,467	39	777,764	46,811	39	777,764	46,792	0	0	0
Rest Best		0	0	4	177,712	17,399	4	177,712	12,981	0	0	0
Rotational Deferment	4	45,575	3,430	13	142,419	15,458	13	142,419	9,832	0	0	0
Continuous Seasonal		0	0	8	33,806	1,891	8	33,806	1,745	0	0	0
Rotational Seasonal	4	48,836	3,550	9	105,058	7,844	9	105,058	4,183	0	0	0
Oeferred Rotation	3	12,279	618	6	30,677	2,272	6	30,677	1,026	0	0	0
SUB TOTAL	25	372,595	29,065	79	1,267,436	91,675	79	1,267,436	76,559	0	0	0
Non-AMPs	92	940,983	90,400	26	46,142	5,361	26	46,142	5,342	0	456,287	61,796
Elimination of Grazing	4	1,987	0	4	1,987	D	4	1,987	0	121	861,860	0
Unallotted	2	2,582	0	2	2,582	0	2	2,582	0	2	0	0
GRAND TOTAL	123	1,318,147	119,465	111	1,318,147	97,036	111	1,318,147	81,901	123	1,318,147	61,796 /1
Other AUMs												
Wildlife			4,802			4,802			5,018			79,255
Wild Horses			384			384			1,583			1,695
Range Developments												
Fences (Miles)		14			214			241			1,475	
Wells		3			14			14			0	
Well Facilities		3			14			14			0	
Pipelines (Miles)		17			89			89			0	
Storage Tanks		14			41			41			0	
Troughs		18			79			79			0	
Wildlife Waters/Fenced		9			48			48			0	
Cattleguards		0			22			22			0	
Springs		1			4			4			0	
Earthen Reservoirs		0			1			1			0	

/1 Existing grazing on non-public lands (includes 169 AUMs previously allocated for wildlife)

EE - Existing Environment
PA - Proposed Action
NA/FE - No Action Alternative and Future Environment
LA - Livestock Adjustment Alternative
PCL - Pasture Capacity Level Alternative
ESR - Enhancement of Sensitive Resource Values Alternative
NG - No Grazing Alternative

Source: BLM Socorro District Grazing Files, Table 1-4, and Table A-1 (Appendix 1, p. A-1)

wildlife and 384 AUMs for wild horses. Implementation would entail the following:

1. The Pasture Capacity Level Alternative would be initiated by reducing livestock on allotments where rest-rotation, scheduled rest-best, or rotational-seasonal systems have been proposed. These grazing systems call for one or more pastures to be rested for at least one year. The proposed grazing preference would ensure that utilization of grazed pastures would average less than 50 percent on these allotments. Average utilization of all pastures on 51 AMPs affected would not exceed 40 percent.

2. The 79 AMPs totaling 1,267,436 acres (788,097 acres of public land) would be intensively managed while 26 non-AMPs totaling 46,142 acres (all public land), 4 elimination of grazing allotments totaling 1,987 acres (all public land), and 2 unallotted allotments consisting of 2,582 acres (all public land) would be managed as they are at present (Appendix 1, Table A-1, p. A-1).

3. Range developments would be the same as in the Proposed Action. Acres disturbed by range development construction are shown in Table 1-4.

ENHANCEMENT OF SENSITIVE RESOURCE VALUES

Under the Enhancement of Sensitive Resource Values Alternative grazing use would be based on the Pasture Capacity Level Alternative with additional deductions to enhance sensitive resource values (15,134 AUMs on 224,655 acres). The proposed grazing use would be set at 81,901 AUMs. This results in a 52-percent reduction from the existing use. There would be 5,018 AUMs apportioned for wildlife and 1,583 AUMs for wild horses.

Table 1-6 summarizes the total acres and AUMs deducted by pasture by allotment for enhancing the sensitive resource values. For some pastures the same acres and AUMs have been deducted to enhance a number of resources. Deductions in items 1 through 6 do not equal the totals for the 'AUMs and Acres Deducted' columns in Table 1-6 because of overlapping deductions where two or more resources are involved. The individual deductions for each resource, for each allotment, are in the BLM Socorro District Office. Implementation would entail the following:

1. Livestock grazing would be eliminated in 76 pastures (11,071 AUMs on 184,802 acres) that have 30 percent or more area in poor range condition and/or critical or severe erosion condition (Table 1-6). These pastures occur on 40 AMPs; grazing would be reduced on 31 of these allotments and eliminated on 9. Grazing would be allowed when range condition improves to fair or better and the erosion condition class improves to a moderate rating.

2. Winter and spring deferment would be provided in at least one pasture on all allotments identified as deer and antelope ranges. In order to meet this goal, allotments 252 and 303 would have their grazing systems revised. No AUMs or acres would be removed from livestock use.

3. Twelve riparian areas that represent important or unique wildlife habitat on public land would not be grazed by livestock (Table 1-6). A total of 27 miles of fence would be needed for the 12 areas. The exclosures would permanently remove livestock use from 2,320 acres and reduce livestock grazing by 216 AUMs.

4. There would be a reduction of 949 AUMs in the VRM Class I Areas (allotments: 006, 039, 052, 059, 077, and 086) and 2,236 AUMs in VRM Class II Areas (allotments: 129, 152, 277, and 293) (Table 1-6). Five hundred and seventy (570) AUMs would be eliminated from pasture 3B in allotment 293 to protect the scenic soaptree yucca area. No developments would be allowed in VRM Class II Areas. VRM Classes III and IV Areas would be enhanced as range and watershed conditions improve as proposed in paragraph one of this alternative.

5. In order to return the wild horse home range to as near its natural state as possible, livestock grazing would be eliminated from the New Tank, New Well, and Bustos Pastures of the Bordo Atravesado Allotment (254). This would make 1,583 AUMs on 19,606 acres available for wild horse use; however, this does not necessarily mean that horse numbers would increase. All interior fences in these pastures would be removed to improve the free roaming character of the area. Vehicle use would be restricted from the area to avoid wild horse harassment and disturbance.

6. To prevent wind erosion and dune development pastures containing deep sand soils (60 inches or greater) with sparse vegetative cover would not be grazed by livestock (Table 1-6). Twenty (20) AUMs and approximately 360 acres would be removed from livestock grazing.

7. The 79 AMPs totaling 1,267,436 acres (788,097 acres of public land) would be intensively managed while 26 non-AMPs totaling 46,142 acres (all public land), 4 elimination of grazing allotments totaling 1,987 acres (all public land), and 2 unallotted allotments consisting of 2,582 acres (all public land) would be managed as they are at present.

8. Range developments would be the same as under the Proposed Action with the addition of 27 miles of fence for a total of 241 miles. Some would be delayed until excluded pastures

TABLE 1-6

SUMMARY OF THE ENHANCEMENT OF SENSITIVE RESOURCE VALUES ALTERNATIVE

1 of 5

Allot.	Pasture /6	Acres Deducted	AUMs Deducted	Poor Range Condition /1	Critical or Severe Watershed Condition /2	Comb. of Range and Watershed /3	Soils	Wilderness /4	Visual Resources	Wildlife	Wild Horses	Acres Available /5	AUMs Available /5
002	Badlands	3,138	31.9			X			X				
	H.Q. Trap	60	5.6			X							
	Horse	939	41.4			X	X						
	Shipping	906	59.3									43,480	1,772
006	Canon del Norte	-0-	133.0					X					
	Headquarters	-0-	11.0					X				13,731	992
016	Barranco	320	19.5							X			
	Puertecito	400	57.0							X		25,117	1,627
036	1	2,666	134.5			X				X		9,430	731
037	Monte	-0-	87.0					X					
	East	-0-	53.0					X				14,076	769
052	1	2,090	78.0					X				-0-	-0-
059	Winter	-0-	53.0					X					
	La Jencia	-0-	37.0					X					
	Upper Salado	-0-	38.0					X					
	River	-0-	18.0					X				27,690	1,351
077	H.Q. Trap	188	11.2		X								
	West	3,444	70.6		X							2,941	54
086	North	-0-	104.0					X					
	Mountain	-0-	91.0					X					
	Aguayo	-0-	192.0					X				27,885	2,013
090	Middle	4,752	197.8			X						9,147	392
114	South Trap	820	26.9			X							
	East	160	20.0							X		45,593	3,803

TABLE 1-6 (continued)

SUMMARY OF THE ENHANCEMENT OF SENSITIVE RESOURCE VALUES ALTERNATIVE

Allot.	Pasture /6	Acres Deducted	AUMs Deducted	Poor Range Condition /1	Critical or Severe Watershed Condition /2	Comb. of Range and Watershed /3	Soils	Wilder-ness /4	Visual Re-sources	Wild-life	Wild Horses	Acres Available /5	AUMs Available /5
122	East	3,264	160.9			X						2,153	75
129	5	8,829	722.3			X							
	8	6,334	335.6			X							
	Crane Place	160	14.7			X							
	4	13,231	1,235.0						X	X /7		43,791	2,909
152	Cerro Verde East	-0-	49.0						X			32,078	2,098
250	1 A	819	11.4			X							
	2 A	1,431	5.9			X							
	2	3,097	48.7			X							
	3	1,678	6.7			X							
	3 A	761	14.1			X							
	Bosque	1,282	19.2			X						8,902	116
252	H.Q. Trap	169	6.8			X							
	Shipping	345	12.7			X						20,771	1,490
253	West	1,518	54.9	X								1,599	149
254	New Tank	6,104	456.9								X		
	Bustos	5,715	527.1								X		
	New Well	7,787	597.7 /8								X	5,557	565
255	All	6,127	283.7			X						-0-	-0-
256	3 North	490	34.2			X						15,297	967
258	1 North	6,939	565.9	X								5,932	200
260	Horse Trap	358	92.8			X							
	West	4,525	208.3			X						13,512	1,065
261	Bosque	6,355	804	X								23,763	1,736

TABLE 1-6 (continued)

SUMMARY OF THE ENHANCEMENT OF SENSITIVE RESOURCE VALUES ALTERNATIVE

Allot.	Pasture /6	Acres Deducted	AUMs Deducted	Poor Range Condition /1	Critical or Severe Watershed Condition /2	Comb. of Range and Watershed /3	Soils	Wilderness /4	Visual Resources	Wildlife	Wild Horses	Acres Available /5	AUMs Available /5
262	South	9,999	686.84			X						13,400	1,444
264	West Trap	209	11.9			X						10,431	1,134
268	Torreon	240	36.4							X			
	Bianchi	160	41.3							X		35,495	1,870
275	Duffy	3,241	271.5			X							
	Pinto	2,893	299.4			X						67,090	5,453
277	Quervo	1,303	24.9			X							
	Gorbon	6,625	217.2			X							
	Chaote	1,539	40.86			X							
	Bosque	7,190	883.2			X			X			10,035	371
279	Trap 2	111	3.04	X									
	5	3,271	6.96	X									
	8	2,980	91.68	X								14,796	1,296
285	House	3,841	254.6		X								
	South Sand	15,084	886.2		X							8,950	1,076
287	South	2,502	64.7		X							2,612	61
288	Trap	40	2.6	X									
	West	880	25.8	X									
	North	2,632	122.2	X						X		1,750	44
293	3 B	3,462	569.7						X			42,901	3,708
294	East Ingram	3,296	333.0	X									
	South	3,461	303.3	X									
	Trap 3	245	27.4	X								4,529	480

TABLE 1-6 (continued)

SUMMARY OF THE ENHANCEMENT OF SENSITIVE RESOURCE VALUES ALTERNATIVE

Allot.	Pasture /6	Acres Deducted	AUMs Deducted	Poor Range Condition /1	Critical or Severe Watershed Condition /2	Comb. of Range and Watershed /3	Soils	Wilder-ness /4	Visual Re-sources	Wild-life	Wild Horses	Acres Available /5	AUMs Available /5
297	2	2,084	0.1			X							
	3	63	-0-			X							
	4	160	1.6							X			
	5	3,061	-0-			X							
	6	4,410	189.5			X							
	7	27	-0-			X						10,191	131
308	North	160	16.8							X			
	South	2,937	67.7			X						2,430	38
312	West	2,719	78.4			X	X						
	East	2,802	161.9			X							
	South	3,929	96.8			X						-0-	-0-
315	All	4,328	67.6			X				X		-0-	-0-
317	East	1,363	58.9			X							
	West	1,967	40.5			X	X						
	Bosque	410	4.6			X	X					5	-0-
318	South	1,676	48.0	X									
	Trap	8	0.11	X								3,644	122
322	6 West	4,162	367.9		X							13,404	854
323	7	1,309	71.4		X							12,008	1,006
325	2	330	27.7			X							
	3	642	16.1			X						12,894	976
327	1	179	26.0		X								
	4-Center	1,038	64.5		X							10,596	677
113	All	290	19.0	X								-0-	-0-

TABLE 1-6 (continued)

SUMMARY OF THE ENHANCEMENT OF SENSITIVE RESOURCE VALUES ALTERNATIVE

Allot.	Pasture /6	Acres Deducted	AUMs Deducted	Poor Range Condition /1	Critical or Severe Watershed Condition /2	Comb. of Range and Watershed /3	Soils	Wilder-ness /4	Visual Re-sources	Wild-life	Wild Horses	Acres Available /5	AUMs Available /5
164	All	203	-0-		X							-0-	-0-
286	All	376	-0-	X								-0-	-0-
302	All	375	-0-	X								-0-	-0-
311	All	109	-0-	X								-0-	-0-
357	All	1,127	37.5			X			X			-0-	-0-
Subtotal		224,655	14,506									669,606	45,615
All Other Allotments		-0-	-0-									423,886	36,286
Grand Total		224,655	14,506									1,093,492	81,901

/1 Elimination of Pastures having 30% or more of its acreage in poor (25% of potential) range condition
/2 Elimination of Pastures having 30% or more of its acreage in critical or severe watershed condition
/3 Elimination of Pastures having 30% or more of its acreage in a combination of poor range and critical or severe watershed condition
/4 Reduction of Grazing within the Ladron Mountain Wilderness Study Area and elimination of Pasture 3B of 297 to protect scenic soaptree and yucca area
/5 Total available acres and AUMs in the allotment
/6 Pastures listed here have, in some cases, been combined into larger pastures by the opening of gates, these larger pastures are used in the proposed grazing systems
/7 Two Riparian Areas are in one pasture
/8 384 of these AUMs have already been deducted from the Pasture Capacity starting level

Source: BLM Socorro District Files

are improved enough to be included in the grazing system. Acres disturbed by range development construction are shown in Table 1-4.

NO GRAZING

Under the No Grazing Alternative all domestic livestock would be removed from public lands. There would be 79,255 AUMs apportioned for wildlife and 1,695 AUMs for wild horses; however, this does not necessarily mean that wildlife or wild horse numbers would increase. Implementation would entail the following:

1. Elimination of grazing would occur on public and BR lands (861,860 acres). No new AMPs would be developed, and those now implemented would be cancelled. There would be approximately 61,796 AUMs available for livestock grazing on non-public land. This is a 64-percent reduction from grazing use.

2. State and private land which is intermingled with public land would have to be used in a way that avoids grazing trespass on public land. It is estimated that 1,475 miles of new fence on the boundaries of private and State land would have to be built by ranchers to exclude livestock from public land. Two or three on-ground and aerial trespass inspectors would be needed. Construction would cost approximately $2,950,000. Short-term disturbance from fence construction would occur on 1,475 acres while long-term disturbance would occur on 295 acres (Table 1-4).

3. No range developments would be maintained or constructed unless necessary for other BLM programs such as wildlife or watershed. Some range developments such as existing fences, which serve no useful purpose and which create undesirable visual intrusions, would be removed from the landscape.

CHAPTER 2

RESOURCE ANALYSIS

INTRODUCTION

This chapter contains the Existing and Future Environments for each resource. In addition, an analysis of the Impacts of the Proposed Action and alternatives, Mitigating Measures, Unavoidable Adverse Impacts, and Irreversible and Irretrievable Commitments is included if necessary.

Existing Environment

This section describes the resources in the Bureau of Land Management (BLM) East Socorro Environmental Statement (ES) Area as they exist today. Emphasis has been placed on those resource components most likely to be impacted if the Proposed Action or one of the alternatives is implemented.

Future Environment

This section describes the resources in the future of the East Socorro ES Area 20 years from the date of implementation. Resource trends which are described here are derived from the existing environment. Livestock adjustments and continued intensive management programs on the 25 existing allotment management plan (AMP) allotments are assumed for the projections in this section.

Impacts - Assumptions and Analysis Guidelines

The impacts resulting from implementation of the Proposed Action and each of the alternatives are identified and analyzed in this section. The resource is analyzed by the major resource components. If a resource or section is not affected or if the impacts are considered insignificant, no discussion is included. Initial impacts in Vegetation and Soils often generate impacts in other resources. These impacts, as well as secondary impacts generated by impacts to other resources, were identified and analyzed through an interdisciplinary team approach. The impacts generated through the analysis of these resources were then traced, analyzed, and incorporated into other resource sections.

Short-term impacts are those expected to take place in and last less than 5 years; long-term impacts are those which would be evident in the 20th year. Short- and long-term data is presented on an annual basis. Local impacts are those restricted to the immediate vicinity of the action discussed, although actual distance varies according to the resource. Area-wide impacts refer to the entire ES Area unless otherwise specified.

Six kinds of grazing systems are proposed in the ES Area. These systems are designed to meet the plant needs as described in Chapter 1. Since 98 percent of the plant species are warm-season species, the July through September non-use treatment that is built into each grazing system meets the plant needs (Figure 2-10). It has been concluded, from literature reviews, that vegetative responses cannot be differentiated among the various grazing systems (Heady et al, 1972; Cook et al, 1962). Therefore, this analysis assumes that vegetation would respond similarly for each of the six proposed grazing systems. The vegetative responses are primarily affected by range condition and range site potential.

Vegetative increases predicted in the Proposed Action are based on vegetative differences between key and comparison areas within the ES Area. These differences were measured by AMP writers during development of AMPs (Appendix 2, p. A-47). A literature review was conducted to identify research studies that measured vegetal response to a particular management technique. These studies were conducted throughout the western states, and the results reflect the range in biological variability. The reader is given the overall average response which verifies that the predictions made, based on key and comparison area data are realistic.

Vegetative predictions made in the various alternatives are based on the predicted values of the Proposed Action and the research literature. The research literature was used to calculate the average herbage response to management implications. This average change was used as a multiplier to adjust the values predicted in the Proposed

Action. The complete methodology is outlined in Appendix 2, p. A-44.

Trend studies are inadequate in the ES Area. For the purpose of this analysis range trend is assumed to be stable. As shown on Table A-6 (Appendix 2, p. 41) 70 percent of the area is presently in poor and fair range condition. This indicates that trend has generally stabilized in a less than desirable range condition.

Because actual livestock use data is not known over most of the ES Area, existing grazing preference is used. Informal conversations with allottees indicate that some are operating at levels lower than the existing use. If this is correct, the actual impacts would be less than that projected in the impact analysis.

The impacts of range development construction are quantified in acres disturbed (total is 559 acres). When taken in context of the total acreage in the ES Area (1,650,214 acres) the impacts of construction to various resources, such as vegetative production, sediment yield, runoff, etc., were considered unmeasurable. Table 2-1 summarizes and compares the impacts to the major resource components.

Analyses for all resources except socio-economics were based on public land AUMs on all allotments and private and State land AUMs on AMP allotments. In socio-economics, the analysis included all of the above AUMs plus the estimated AUMs on private and State land on non-AMP allotments. In order to determine direct income and thoroughly analyze the impacts in the socio-economic section discussion it was necessary to include all AUMs in the ES Area.

Mitigating Measures

The measures analyzed in this section are actions which would reduce or eliminate impacts identified as adverse by the resource specialist. Each measure is analyzed in relation to a specific impact. All measures are real, enforceable, and committed to by the District Manager should the Proposed Action be approved and implemented.

Unavoidable Adverse Impacts

This section discusses only the major unavoidable adverse impacts that would result from implementation of the Proposed Action. These are impacts that cannot be mitigated or remain after partial mitigation of the impacts.

Irreversible and Irretrievable

This section considers the irreversible and irretrievable commitment of resources. It identifies the extent to which the Proposed Action would irreversibly curtail the potential uses of the land and resources. In this context, the term irreversible is defined as incapable of being reversed; once initiated, use would continue. The term irretrievable means irrecoverable; not reasonably retrievable; once used, it is not replaceable.

PHYSICAL SETTING

Existing Environment

This section presents a summary of the physical setting of the ES Area.

CLIMATE

The climate of the area is continental, and ranges from arid in the centrally located Rio Grande Valley to semiarid on the upland areas on either side of the valley. The summers are hot and relatively moist, and the winters are cool and dry. Average summer temperatures are in the 90-degree range. Average winter temperatures drop to 34 degrees. The frost-free period is from mid-April to late October.

Average annual precipitation ranges from 8 inches in the valley to 14 inches or more on mesas and uplands (Map 2-1). Fifty (50) to 60 percent of the total average annual precipitation falls during June through September. Most precipitation received comes in the form of local, short-duration, high-intensity summer thunderstorms.

Annual average wind speed is about 9 miles per hour, although spring winds are often much stronger, gusting to 40 miles per hour. The strongest winds usually come from the southwesterly quadrant. Evaporation loss from water surfaces is about 60 to 70 inches per year.

TOPOGRAPHY

Terrain varies considerably throughout the grazing area. Elevations range from about 4,550 feet in the valley to about 9,176 feet on Ladron Mountain. Major features include the Rio Grande Valley, the Magdalena, Socorro-Lemitar, and Ladron Mountains, Jornada del Muerto plains and the mesa-studded areas to the east and northwest.

GEOLOGY

Most of the area is in the Basin and Range physiographic province and is dominated by the Rio Grande Rift. Uplifted fault blocks of Paleozoic rock units form the San Mateo-Socorro-Lemitar Mountains to the west of the Rio Grande, and the San Andres-Chupadera Mesa-Los Pinos Mountains to the east. The Rio Grande Valley is down thrown fault blocks, filled to a depth of 20,000 feet with sediments eroded from the neighboring mountains.

The easterly portion of the ES Area is a mesa of Paleozoic rock units partially overlain by recent sediments. Ladron Mountain, west of the Rio Grande, is composed, predominately, of metasedi-

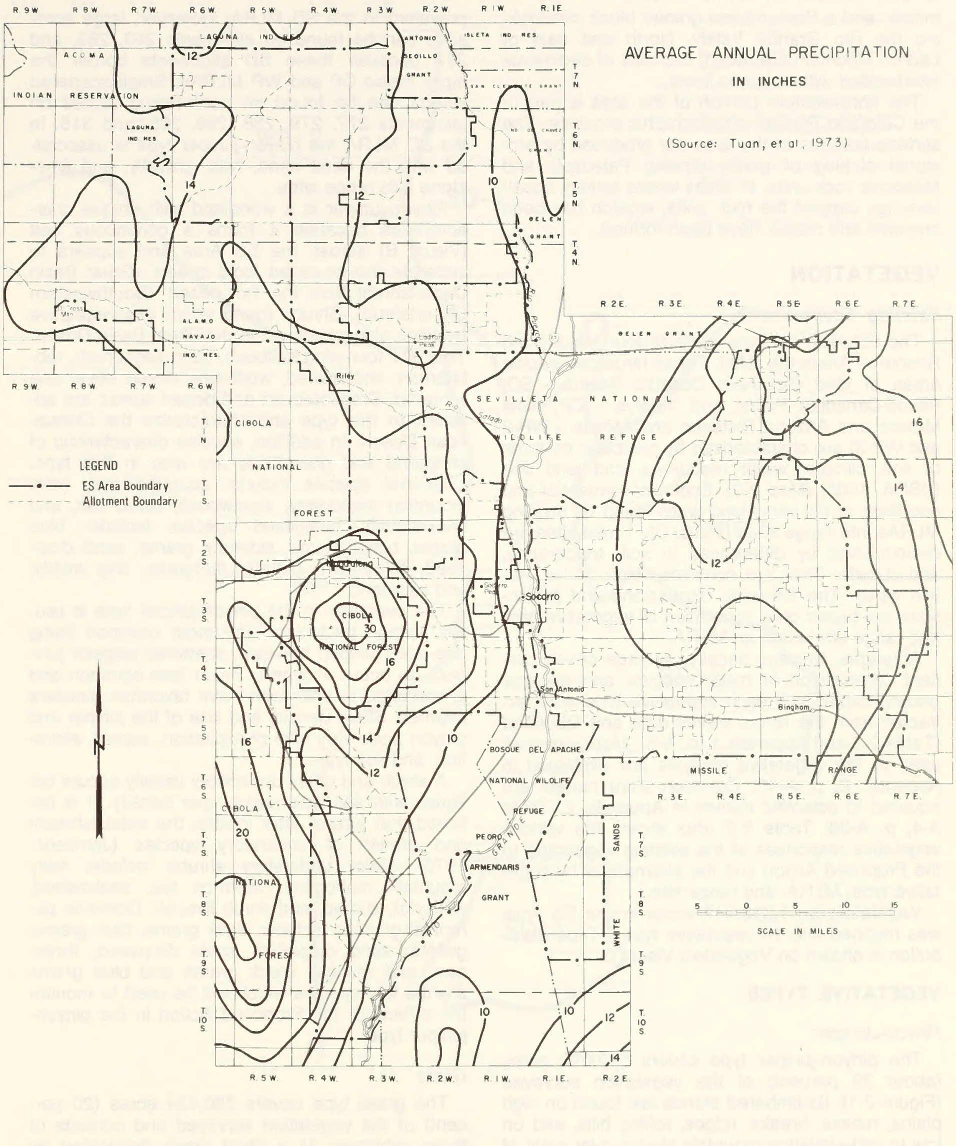
TABLE 2-1

SUMMARY OF IMPACTS

	Existing	Proposed Action		No Action Alternative and Future Environment		Livestock Adjustment Alternative		Pasture Capacity Level Alternative		Enhancement of Sensitive Resource Values Alternative		No Grazing Alternative	
		Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term
Grazing Use (AUMs)	170,697	119,465	173,916	159,025	170,836	119,465	165,736	97,036	205,665	81,901	209,620	0	0
Physical Setting	STABLE	NO CHANGE	NO CHANGE	NO CHANGE	NO CHANGE	NO CHANGE	NO CHANGE	NO CHANGE	NO CHANGE	NO CHANGE	NO CHANGE	NO CHANGE	NO CHANGE
Vegetation													
Production (AUMs)	134,942	SI	184,488	UM	146,988	SI	174,811	SI	216,592	SI	221,920	SI	359,924
% Change from Existing (Range Survey)	-	SI	+37	UM	+9	SI	+30	SI	+61	SI	+64	SI	+167
Range Condition (% change)													
Excellent	7,086 ac.	UM	+338	UM	+81	UM	+271	UM	+551	UM	+551	UM	+542
Good	319,807 ac.	UM	+11	UM	+3	UM	+8	UM	+17	UM	+17	UM	+17
Fair	770,700 ac.	UM	-6	UM	-2	UM	-5	UM	-10	UM	-10	UM	-10
Poor	125,306 ac.	UM	-8	UM	-2	UM	-6	UM	-12	UM	-12	UM	-12
Density (%)	8	UM	11	UM	SI	UM	10	UM	12	UM	12	UM	11
Cover (%)	37	UM	40	UM	SI	UM	39	UM	45	UM	45	UM	45
Soils													
Sediment Yield (Ac-Ft/Yr)	1,410 to 1,555	UM	1,055 to 1,170	UM	1,310 to 1,450	UM	1,135 to 1,255	UM	980 to 1,080	UM	980 to 1,080	UM	455 to 500
% Decrease from Existing	-	UM	26	UM	7	UM	19	UM	31	UM	31	UM	46
Water													
Infiltration (in./hr.)	.64	UM	.98	UM	.64	UM	.98	UM	.98	UM	.98	UM	1.19
Runoff (% decrease from Existing)	-	UM	3	UM	1	UM	3	UM	12	UM	12	UM	16
Groundwater withdrawal (Ac-Ft/Yr)	271	214	277	258	272	214	266	189	313	171	318	150	150
Livestock Grazing													
Number of Operators	102	96	98	102	102	96	98	96	98	91	98	87	87
AUs	20,081	15,804	20,529	19,108	20,200	15,804	19,724	13,931	23,183	12,674	23,598	11,006	11,006
Socio-Economics													
Direct Income ($)	2,507,057	1,979,537	2,552,837	2,399,368	2,532,589	1,979,537	2,467,854	1,689,481	2,613,109	1,549,126	2,758,084	1,332,536	1,332,536
Permit Value ($1000)	18,081.0	14,226.3	18,361.8	17,286.3	18,137.7	14,226.3	17,811.0	12,525.3	20,857.5	11,407.5	21,267.9	9,953.1	9,953.1
Wildlife													
(AUMs Apportioned)	1,903	4,802	5,041	2,362	2,394	4,802	4,893	4,802	5,057	5,018	5,287	79,255	138,914
Deferred Habitat (ac.)													
Deer-winter deferment	17,458	95,101	95,101	24,985	24,985	24,985	24,985	95,101	95,101	112,151	115,107	217,673	217,673
Antelope-spring deferment	26,848	212,568	212,568	49,728	49,728	49,728	49,728	212,568	212,568	235,615	212,568	459,050	459,050
Minimum deferred at any one time	100,210	315,239	315,239	108,053	108,053	108,053	108,053	315,239	315,239	533,430	337,525	838,808	838,808
Wild Horses (AUMs Apportioned)	0	384	549	384	549	384	549	384	549	1,583	3,111	1,695	3,535
Cultural Resources (Rate of Disturbance from Existing)	-	SD	SD	same as EE	SD-less than PA	SD-slightly less than PA	SD-slightly less than PA	SD-slightly greater than PA	SD-slightly greater than PA	SD-slightly greater than PA	SD-slightly greater than PA	SD-greater than PA	SD-greater than PA
Recreation (Visitor Days)	34,946	SI	49,903	SI	49,903	SI	49,903	SI	49,903	SI	49,903	SI	49,903
Visual Resources (Acres Disturbed)	-	579	339	90	67	90	67	579	339	607	344	1,475	295
Wilderness	STABLE	NO CHANGE	NO CHANGE	NO CHANGE	NO CHANGE	NO CHANGE	NO CHANGE	NO CHANGE	NO CHANGE	NO CHANGE	SI	NO CHANGE	SI

UM = Unmeasurable in the short term
SD = Slight, but unmeasurable, decrease
SI = Slight, but unmeasurable, increase
EE = Existing Environment
PA = Proposed Action

Source: Tables 1-4, 1-5, 2-2, 2-6, 2-9, 2-14, 2-18, 2-19, 2-24, 2-25, 2-28, 2-31, 2-34, 2-35, A-18, and A-24



MAP 2-1. Average Annual Precipitation

ments, and a Precambrian granite block overlooking the Rio Grande Valley. North and east of Ladron Mountain are recent deposits of sediments interbedded with volcanic flows.

The northwestern portion of the area is part of the Colorado Plateau physiographic province. The surface features of the area are produced by erosional etching of gently dipping Paleozoic and Mesozoic rock units. In areas where tertiary basalt lava has capped the rock units, erosion has been checked and mesas have been formed.

VEGETATION

Existing Environment

The ES Area contains parts of four Major Land Resource Areas (MLRAs). These large geographic areas of land (Southern Desertic Basins - SD, Pecos-Canadian Plains and Valleys - CP, New Mexico and Arizona Plateaus and Mesas - WP-2 and WP-3) are characterized by particular patterns of soil, climate, water resources, and land use (USDA, 1965) (Map 2-2). Ecological potential and condition of the rangeland were found by dividing MLRAs into range sites (Visual C). These sites are distinguished by differences in soil, topography, and climate. They are correlated with 14 vegetative types. The following discussions and predictions are based on a correlation of vegetative type and range site within an MLRA.

Acreages, average density, average cover, percent composition of major species, and average grazing capacity of each vegetative type were extracted from the range survey data and tabulated (Table 2-2 and Appendix 1, p. A-8). Methodologies used in the vegetative analysis are explained in Appendix 2, p. A-40. Common plant names are equated to scientific names in Appendix 2, Table A-4, p. A-38. Table 2-2 also shows the various vegetative responses of the existing vegetation to the Proposed Action and the alternatives by vegetative type, MLRA, and range site.

Vegetation on 1,318,147 acres in the ES Area was mapped into 14 vegetative types. Type distribution is shown on Vegetative Visual B.

VEGETATIVE TYPES

Pinyon-Juniper

The pinyon-juniper type covers 510,095 acres (about 39 percent) of the vegetation surveyed (Figure 2-1). Its timbered stands are found on high plains, mesas, breaks, ridges, rolling hills, and on low to mid-elevation mountain slopes over most of the CP and WP MLRAs. It occurs on most soils within these MLRAs with the best stands growing on the sandy, limestone hills, basalt hills, malpais, and loamy range sites. Pinyon-juniper is not as prevalent in the SD MLRA. However, large acreages can be found on allotments 263, 283, and 297 because these SD allotments border the more mesic CP and WP MLRAs. Small scattered stands can be found on north-facing slopes on allotments 277, 279, 288, 299, 308, and 315. In the SD MLRA the pinyon-juniper type is associated with the deep sand, hills, gravelly, and limestone hills range sites.

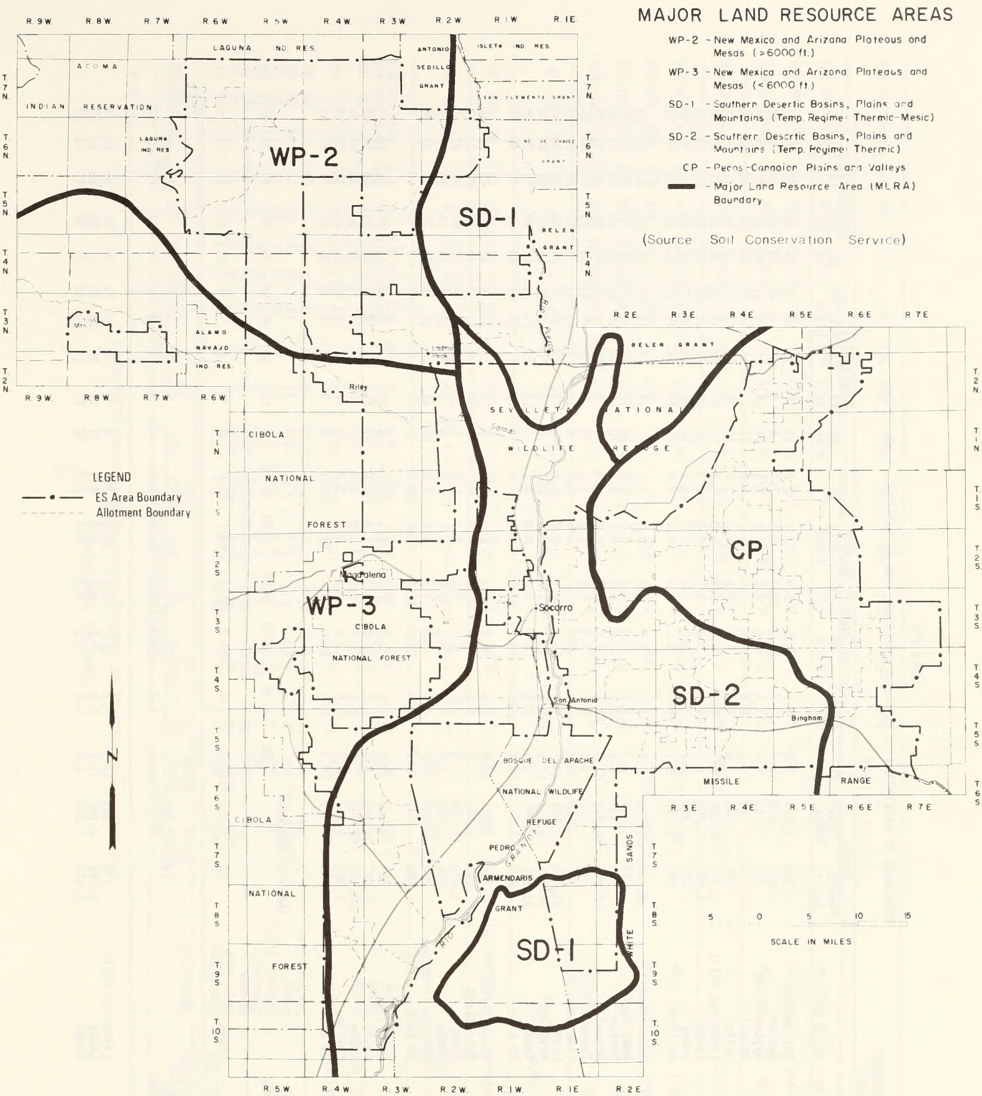
Pinyon-juniper is a woodland with unique characteristics because it forms a continuous belt (Visual B) across the ES Area and appears to separate the so-called 'cold desert' (Great Basin Desertshrub) from the 'hot desert' (Southwestern Desertshrub). Shrubs found within this vegetative type are also prominent in the Great Basin Desert. They are four-wing saltbush, sand sagebrush, rabbitbrush, snakeweed, wolfberry, desert olive, and winterfat. Creosotebush and desert sumac are adjacent to this type and characterize the Chihuahuan Desert. In addition, species characteristic of chaparral and grasslands are also in this type. Chaparral species include: apache-plume, hairy mountain mahogany, squawbush, scrub oak, and brickellbush. Grassland species include: blue grama, black grama, sideoats grama, sand dropseed, three-awn, galleta, fluffgrass, ring muhly, and sacaton.

The overstory in the pinyon-juniper type is usually formed by juniper, the most common being one-seed juniper; however, scattered alligator junipers do occur. Pinyon is much less common and is restricted to sites with more favorable moisture regimes. Stand density and size of the juniper and pinyon trees vary with precipitation, aspect, elevation, and soil type.

A shrub and grass understory usually occurs but varies with soil type and juniper density. It is believed that juniper litter inhibits the establishment and growth of understory species (Jameson, 1970). Major understory shrubs include: hairy mountain mahogany, Mormon tea, snakeweed, winterfat, sumac, and shrub liveoak. Common perennial grasses include: black grama, blue grama, galleta, sand dropseed, spike dropseed, three-awn, and muhlys. Black grama and blue grama are the key species which will be used to monitor the effects of the Proposed Action in the pinyon-juniper type.

Grass

The grass type covers 260,434 acres (20 percent) of the vegetation surveyed and consists of three subtypes: 1) a short grass dominated by blue grama, black grama, and galleta which is generally found on hills, ridges, and mesas; 2) a mid-grass dominated by alkali sacaton which dominates heavier soils in open valleys and re-



MAP 2-2. Major Land Resource Areas

TABLE 2-2

RESPONSES OF VEGETATION TO THE PROPOSED ACTION AND ALTERNATIVES (LONG TERM)

Vegetative Type & MLRAs	Range Site	Acres: Public Acres	Acres: Total Acres	Grazing Capacity AC/AUM: EE /4	Grazing Capacity AC/AUM: Potent /1	Grazing Capacity AC/AUM: PA /4	Grazing Capacity AC/AUM: LA	Grazing Capacity AC/AUM: PCL/ ESR	Grazing Capacity AC/AUM: NG	Density (%): EE /4	Density (%): PA /4	Density (%): LA	Density (%): PCL/ ESR	Density (%): NG	Cover (%): EE /4	Cover (%): PA /4	Cover (%): LA	Cover (%): PCL/ ESR	Cover (%): NG
Grassland, CP	Bottomland	3,734	13,178	5.0	0.7	3.5	3.9	3.1	2.9	13	17	16	19	15	24	35	32	39	28
	Gypsum	266	266	10.3	7.7	10.3	10.3	9.2	7.7	8	8	8	9	10	39	39	39	43	48
	Gypsum Hills	53	53	4.6	3.5	4.6	4.6	4.1	3.5	14	14	14	16	17	31	31	31	34	38
	Gravelly	0	63	7.5	2.8	7.5	7.5	6.7	5.6	11	11	11	12	11	30	30	30	33	30
	Hills	282	842	4.5	3.7	4.5	4.5	4.0	3.4	15	15	15	17	16	31	31	31	34	33
	Limestone Hills	1,336	2,186	6.9	9.3	5.9	6.2	5.3	4.6	10	10	10	11	11	15	15	15	17	17
	Loamy	9,662	19,759	6.9	4.6	3.6	4.5	3.2	3.3	11	15	14	17	14	17	26	23	29	23
	Sandy	120	934	6.8	3.4	5.0	5.5	4.5	4.1	11	14	13	16	12	14	18	17	20	15
	No Site	495	1,147	5.2	N/A	5.2	5.2	4.6	3.9	18	18	18	20	20	56	56	56	62	62
Grassland, SD	Bottomland	14,012	21,314	7.7	1.2	3.7	4.7	3.3	3.6	11	15	14	17	15	19	23	22	26	24
	Deep Sand	13	13	5.1	5.5	5.1	5.1	4.5	3.8	10	10	10	11	12	19	19	19	21	24
	Gypsum	293	339	6.8	12.2	6.8	6.8	6.1	5.1	10	10	10	11	12	41	41	41	46	50
	Gravelly	23,355	35,439	11.0	11.0	9.2	9.7	8.2	7.3	9	10	10	11	11	43	46	45	51	52
	Igneous Hills	98	123	7.1	8.9	7.1	7.1	6.3	5.3	9	9	9	10	11	55	55	55	61	66
	Limestone Hills	119	122	15.4	7.0	9.9	11.3	8.8	8.5	6	10	9	11	11	60	67	65	74	80
	Loamy	13,752	17,021	11.0	4.4	5.5	6.9	4.9	5.2	11	14	13	16	15	27	30	29	33	34
	Malpais	14,452	16,612	11.2	5.1	11.2	11.2	10.0	8.4	8	8	8	9	10	57	57	57	63	69
	Sandy	31,131	36,895	8.1	4.5	4.8	5.7	4.3	4.2	9	12	11	13	13	20	25	24	28	28
	No Site	853	1,311	27.2	N/A	28.7	28.5	25.5	21.3	9	10	10	11	11	43	42	42	46	49
Grassland, WP-2	Basalt Hills	2,155	3,261	11.9	1.9	6.7	8.1	6.0	6.0	6	10	9	11	9	37	46	43	51	48
	Bottomland	631	1,771	11.0	0.5	5.4	6.9	4.8	5.1	5	10	9	11	7	11	24	20	27	16
	Loamy	4,103	15,884	13.8	3.0	5.3	7.5	4.7	5.6	6	12	10	13	9	16	24	22	27	19
	Sandy	796	2,736	6.2	3.5	6.2	6.2	5.5	4.7	9	9	9	10	10	24	24	24	27	26
	Shallow Sandstone	260	484	4.7	4.4	4.7	4.7	4.2	3.5	16	16	16	18	18	34	34	34	37	38
	No Site	166	248	26.7	N/A	26.7	26.7	23.8	20.0	2	2	2	2	2	8	8	8	9	9
Grassland, WP-3	Gravelly	865	3,006	10.7	1.5	5.7	7.0	5.1	5.3	8	14	12	16	10	21	26	25	29	24
	Hills	10,167	16,901	6.9	2.1	6.6	6.7	5.9	5.0	10	11	11	12	12	56	53	54	59	62
	Loamy	24,583	42,912	7.8	2.5	5.4	6.0	4.8	4.5	11	14	13	16	14	30	37	35	41	38
	Shallow	4,461	5,185	6.7	3.1	3.4	4.3	3.0	3.2	11	17	15	19	13	11	21	18	20	13
	No Site	328	429	29.4	N/A	29.4	29.4	26.2	22.1	8	8	8	9	9	26	26	26	28	31
Grassland TOTAL AVERAGE		162,541	260,434	8.98	4.30	5.70	6.84	5.42	5.12	6	13	14	14	13	30	35	33	39	37
Perennial Forb WP-2	Loamy	11	107	105.3	3.0	105.3	105.3	93.7	79.0	4	4	4	4	4	11	11	11	12	11
Perennial Forb TOTAL AVERAGE		11	107	105.3	3.0	105.3	105.3	93.7	79.0	4	4	4	4	4	11	11	11	12	11
Sagebrush CP	Limestone Hills	193	193	11.9	9.3	11.9	11.9	10.6	8.9	9	9	9	10	11	19	19	19	21	24
	Loamy	1,796	2,109	11.2	4.6	7.1	8.2	6.3	6.1	11	17	15	19	18	14	20	18	22	21
	Sandy	5,914	7,870	8.5	3.4	7.2	7.5	6.4	5.7	10	12	11	13	13	13	19	17	21	19

TABLE 2-2 (continued)

RESPONSES OF VEGETATION TO THE PROPOSED ACTION AND ALTERNATIVES (LONG TERM)

Vegetative Type & MLRAs	Range Site	Acres: Public Acres	Acres: Total Acres	Grazing Capacity AC/AUM: EE /4	Potent /1	PA /4	LA	PCL/ ESR	NG	Density (%): EE /4	PA /4	LA	PCL/ ESR	NG	Cover (%): EE /4	PA /4	LA	PCL/ ESR	NG
Sagebrush, SD	Bottomland	547	703	10.4	1.2	10.3	10.3	9.2	7.7	8	8	8	9	9	14	14	14	16	17
	Deep Sand	13,697	15,995	45.6	5.5	45.6	45.6	40.6	34.2	7	7	7	8	8	11	11	11	12	13
	Gypsum	855	908	22.9	12.2	22.9	22.9	20.4	17.2	9	9	9	10	11	10	10	10	11	12
	Gravelly	43	43	4.2	11.1	4.2	4.2	3.7	3.2	16	16	16	18	20	21	21	21	23	26
	Igneous Hills	131	131	9.3	8.9	9.3	9.3	8.3	7.0	8	8	8	9	10	11	11	11	12	14
	Sandy	31,889	40,683	6.6	4.5	4.9	5.3	4.4	4.0	11	14	13	16	15	22	25	24	28	28
	Shallow Sand	678	749	14.7	5.4	14.7	14.7	13.1	11.0	6	6	6	7	7	26	26	26	29	32
Sagebrush, WP-2	Malpais	358	572	13.3	2.6	13.3	13.3	11.8	10.0	10	10	10	11	12	30	30	30	33	35
Sagebrush, WP-3	Hills	194	426	10.6	2.1	8.3	8.9	7.4	6.7	10	10	10	11	11	41	20	26	22	37
	Loamy	58	58	83.3	2.5	N/A	N/A	N/A	N/A	3	N/A	N/A	N/A	N/A	4	N/A	N/A	N/A	N/A
	Sandy	1,012	1,012	12.4	2.9	N/A	N/A	N/A	N/A	8	N/A	N/A	N/A	N/A	8	N/A	N/A	N/A	N/A
Sagebrush TOTALS		57,365	71,452																
AVERAGE				16.24	4.65	14.98	15.28	13.36	11.48	10	12	11	14	13	18	21	20	23	23
Mountain Shrub, CP	Limestone Hills	95	192	15.6	9.3	15.6	15.6	13.9	11.7	10	10	10	11	11	29	29	29	32	32
Mountain Shrub TOTALS		95	192																
AVERAGE				15.6	9.3	15.6	15.6	13.9	11.7	10	10	10	11	11	29	29	29	32	32
Waste, CP	No Site	515	515	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Waste, SD	No Site	0	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Waste, WP-2	No Site	2,134	2,607	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Waste, WP-3	No Site	3,681	4,811	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Waste TOTALS		6,330	7,988	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Barren, SD	No Site	44	44	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Barren, WP-2	No Site	20	69	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Barren, WP-3	No Site	281	809	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Barren TOTAL		345	922																
AVERAGE				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

TABLE 2-2 (continued)

RESPONSES OF VEGETATION TO THE PROPOSED ACTION AND ALTERNATIVES (LONG TERM)

Vegetative Type & MLRAs	Range Site	Acres: Public Acres	Acres: Total Acres	Grazing Capacity AC/AUM: EE /4	Potent /1	PA /4	LA	PCL/ ESR	NG	Density (%): EE /4	PA /4	LA	PCL/ ESR	NG	Cover (%): EE /4	PA /4	LA	PCL/ ESR	NG
Pinyon-juniper, CP	Bottomland	105	1,206	10.0	0.7	10.2	10.1	9.1	7.6	8	8	8	9	8	20	20	20	22	20
	Gypsum	16,786	36,640	13.8	10.9	8.4	9.8	7.5	7.4	9	11	10	12	11	24	28	27	31	28
	Gypsum Hills	9,546	12,790	71.6	7.5	71.6	71.6	63.7	53.7	7	7	7	8	8	30	30	30	33	35
	Gravelly	3,015	4,517	12.7	2.8	12.7	12.7	11.3	9.5	7	7	7	8	8	50	50	50	56	58
	Hills	12,573	15,725	15.7	3.7	15.5	15.6	13.8	11.7	9	9	9	10	11	60	64	63	71	74
	Limestone Hills	36,611	49,418	13.4	9.3	9.5	10.5	8.5	7.9	8	9	9	10	10	47	51	50	57	58
	Loamy	13,235	21,407	13.9	4.6	6.7	8.6	6.0	6.4	9	12	11	13	12	35	46	43	51	46
	Malpais	782	1,135	3.6	3.5	3.6	3.6	3.2	2.7	17	17	17	19	20	38	38	38	42	44
	Sandy	15,373	19,969	19.7	3.4	8.1	11.1	7.2	8.3	8	11	10	12	12	30	39	36	43	42
	Shallow	16,172	22,669	10.8	3.6	6.4	7.5	5.7	5.7	8	10	9	11	11	48	53	52	59	59
	No Site	199	224	6.8	N/A	6.8	6.8	6.1	5.1	11	11	11	12	13	51	49	50	55	60
Pinyon-juniper, SD	Deep Sand	4,561	13,703	23.8	5.5	24.2	24.1	21.5	18.1	6	6	6	7	6	21	21	21	23	23
	Gypsum	46	104	38.2	12.2	38.2	38.2	34.0	28.7	6	6	6	7	7	16	16	16	18	18
	Gravelly	3,448	8,355	121.1	11.1	121.1	121.1	107.8	90.8	5	5	5	6	5	26	26	26	29	29
	Igneous Hills	820	3,203	16.5	8.9	16.5	16.5	14.7	12.4	7	7	7	8	7	23	23	23	26	24
	Limestone Hills	3,532	4,522	16.0	7.0	12.5	13.4	11.1	10.1	11	11	11	12	13	66	72	70	80	82
	Loamy	354	381	4.9	4.4	4.9	4.9	4.4	3.7	16	16	16	18	20	41	41	41	46	50
	Malpais	349	836	24.6	5.1	24.6	24.6	21.9	18.5	6	6	6	7	7	51	51	51	57	56
	Sandy	381	2,031	20.2	4.5	20.2	20.2	18.0	15.2	6	6	6	7	6	25	25	25	28	26
	No Site	694	802	9.4	N/A	9.4	9.4	8.4	7.1	11	11	11	12	13	55	55	55	61	66
Pinyon-juniper, WP-2	Basalt Hills	8,036	21,243	10.5	1.9	10.5	10.5	9.3	7.9	8	8	8	9	9	33	33	33	36	36
	Limestone Hills	6,301	14,964	14.4	3.5	13.2	13.5	11.7	10.1	7	8	8	9	8	44	45	45	50	49
	Loamy	2,218	6,400	11.7	3.0	7.2	8.4	6.4	6.3	8	12	11	13	10	27	38	35	42	33
	Malpais	9,751	23,381	10.9	2.6	9.8	10.1	8.7	7.6	9	9	9	10	10	38	45	43	50	44
	Sandstone Hills	1,492	4,833	38.0	3.4	38.0	38.0	33.8	28.5	7	7	7	8	8	47	47	47	52	50
	Sandy	8,174	16,640	12.2	3.5	12.2	12.2	10.9	9.2	7	7	7	8	8	15	15	15	17	17
	Shallow Sandstone	6,724	17,796	11.8	3.9	11.8	11.8	10.5	8.9	7	7	7	8	8	35	35	35	39	38
	No Site	2,771	8,533	19.6	N/A	19.6	19.6	17.4	14.7	6	6	6	7	6	50	50	50	56	54
Pinyon-juniper, WP-3	Basalt Hills	1,144	1,333	6.4	1.9	6.6	6.5	5.9	4.9	12	12	12	13	14	53	53	53	59	64
	Gravelly	21,186	30,617	9.7	1.5	6.8	7.6	6.1	5.7	9	12	11	13	12	50	53	52	59	60
	Hills	33,950	46,712	9.9	2.1	4.2	5.7	3.7	4.3	11	16	15	18	16	43	47	46	52	53
	Limestone Hills	20,620	30,956	16.6	3.5	8.0	10.2	7.1	7.7	9	12	11	13	12	63	67	66	74	75
	Loamy	39,558	45,607	17.9	2.5	18.9	18.6	16.8	14.0	7	8	8	9	9	40	40	40	45	48
	Malpais	561	561	26.7	2.6	N/A	N/A	N/A	N/A	6	N/A	N/A	N/A	N/A	19	N/A	N/A	N/A	N/A
	Shallow	16,582	20,283	12.8	3.5	9.8	10.6	8.7	7.9	9	11	10	12	12	50	54	53	60	63
	No Site	225	599	5.9	N/A	5.9	5.9	5.3	4.4	13	13	13	14	14	43	43	43	48	47
Pinyon-juniper TOTAL		317,875	510,095																
AVERAGE				17.23	4.56	14.08	14.89	12.53	11.19	8	10	10	11	11	41	44	43	49	49
Broadleaf, SD	Gravelly	63	224	3.4	11.1	3.4	3.4	3.0	2.6	19	19	19	21	20	92	92	92	102	98
	No Site	255	8,874	0.1	N/A	0.1	0.1	0.1	0.1	1	1	1	1	1	2	2	2	2	2
Broadleaf, WP-2	No Site	36	122	22.9	N/A	22.9	22.9	20.4	17.2	4	4	4	4	4	5	5	5	6	5
Broadleaf, WP-3	No Site	3,205	5,649	47.3	N/A	47.5	47.4	42.3	35.6	5	5	5	6	6	11	11	11	12	12
Broadleaf TOTAL		3,559	14,869																
AVERAGE				18.27	11.1	18.34	18.31	16.34	13.7	2.82	2.82	3	3	3	7	7	7	7	7

TABLE 2-2 (continued)

RESPONSES OF VEGETATION TO THE PROPOSED ACTION AND ALTERNATIVES (LONG TERM)

Vegetative Type & MLRAs	Range Site	Acres: Public Acres	Acres: Total Acres	Grazing Capacity AC/AUM: EE /4	Potent /1	PA /4	LA	PCL/ ESR	NG	Density (%): EE /4	PA /4	LA	PCL/ ESR	NG	Cover (%): EE /4	PA /4	LA	PCL/ ESR	NG
Creosote, CP	Gypsum	122	174	31.3	10.9	31.3	31.3	27.9	23.5	6	6	6	7	7	31	31	31	34	36
	Gypsum Hills	167	450	19.2	7.5	19.2	19.2	17.1	14.4	4	4	4	4	4	22	22	22	24	24
	Gravelly	871	991	157.9	2.8	157.9	157.9	140.5	118.4	6	6	6	7	7	72	72	72	89	87
	Hills	274	963	10.2	3.7	10.7	10.6	9.5	7.9	13	13	13	14	14	17	17	17	19	18
	Limestone Hills	3,545	4,093	23.7	9.3	23.7	23.7	21.1	17.8	9	9	9	10	11	56	56	56	62	68
	Loamy	319	1,009	292.8	4.6	292.8	292.8	260.6	219.6	3	3	3	3	3	31	31	31	34	33
	Sandy	18	18	35.7	3.4	35.7	35.7	31.8	26.8	3	3	3	3	4	16	16	16	18	20
Creosote, SD	Bottomland	30	184	12.5	1.2	12.5	12.5	11.1	9.4	11	11	11	12	11	31	31	31	34	32
	Deep Sand	755	768	47.6	5.5	47.6	47.6	42.4	35.7	6	6	6	7	7	32	32	32	35	40
	Gravelly	120,308	156,322	75.9	11.1	55.0	60.4	49.0	45.3	6	8	7	9	8	58	58	58	65	69
	Igneous Hills	3,491	4,253	13.7	8.9	13.0	13.2	11.6	9.9	8	8	8	9	10	62	62	62	69	78
	Limestone Hills	15,181	18,562	20.6	7.0	15.0	16.5	13.4	12.3	9	10	10	11	11	61	62	62	68	74
	Loamy	2,450	3,262	10.8	4.4	6.2	7.4	5.5	5.5	13	17	16	19	18	33	38	37	42	42
	Sandy	6,850	7,881	29.2	4.5	16.3	19.7	14.5	14.7	6	8	7	9	9	40	47	45	52	54
	No Site	3,192	4,605	39.2	N/A	39.2	39.2	34.9	29.4	7	7	7	8	8	47	47	47	52	55
Creosote, WP-3	Gravelly	4,519	5,991	32.0	1.5	21.8	24.5	19.4	18.3	6	7	7	8	8	46	48	47	53	56
	Hills	216	248	36.7	2.1	36.7	36.7	32.7	27.5	7	7	7	8	8	49	49	49	55	59
	Limestone Hills	1,979	1,979	29.1	3.5	29.1	29.1	25.9	21.8	5	5	5	6	6	79	79	79	88	98
	No Site	12	30	28.5	N/A	28.5	28.5	25.4	21.4	9	9	9	10	10	58	58	58	65	64
Creosote TOTAL		164,299	211,783																
AVERAGE				64.32	9.79	47.56	51.90	42.37	38.91	7	8	7	9	9	56	57	57	64	68
Mesquite, SD	Deep Sand	1,132	2,007	19.7	5.5	16.1	17.0	14.3	12.8	16	16	16	18	18	36	36	36	40	41
	Gravelly	1,822	2,955	48.8	11.1	48.8	48.8	43.4	36.6	13	13	13	14	15	38	38	38	42	44
	Loamy	82	82	5.8	4.4	5.8	5.8	5.2	4.4	10	10	10	11	12	75	75	75	83	93
	Sandy	5,320	6,944	9.3	4.5	4.8	6.0	4.3	4.5	10	14	13	16	15	30	34	33	37	38
	No Site	743	1,566	17.6	N/A	17.6	17.6	15.7	13.2	9	9	9	10	10	50	50	50	55	56
Mesquite, WP-2	Basalt Hills	5,760	7,467	8.0	1.9	8.0	8.0	7.1	6.0	10	10	10	11	12	34	34	34	37	40
Mesquite, WP-3	Gravelly	182	182	5.8	1.5	3.8	4.3	3.4	3.2	10	15	14	17	17	75	80	79	89	97
	Loamy	317	4,024	11.7	2.5	11.7	11.7	10.4	8.8	8	8	8	9	8	41	41	41	46	42
	Shallow	86	132	20.8	3.5	20.8	20.8	18.5	15.6	6	6	6	7	7	45	45	45	50	52
Mesquite TOTAL		15,444	25,359																
AVERAGE				15.26	4.22	13.73	14.13	12.21	10.61	10	12	11	13	13	36	37	37	41	42
Saltbush, CP	Bottomland	184	236	3.9	0.7	3.9	3.9	3.5	2.9	15	15	15	17	18	41	41	41	46	49
	Gypsum Hills	986	1,487	13.3	7.5	13.3	13.3	11.8	10.0	10	10	10	11	12	25	25	25	28	29
	Loamy	356	658	8.6	4.6	10.7	10.2	9.5	7.6	10	8	9	9	10	20	15	16	17	20
Saltbush, SD	Deep Sand	836	836	10.4	5.5	10.4	10.4	9.3	7.8	9	9	9	10	11	20	20	20	22	25
	Gypsum	127	305	320.0	12.2	320.0	320.0	284.8	240.0	6	6	6	7	7	9	9	9	10	10
	Gravelly	0	165	24.4	11.1	24.4	24.4	21.7	18.3	3	3	3	3	3	27	27	27	30	27
	Loamy	3,435	4,628	21.2	4.4	19.3	19.8	17.2	14.8	6	7	7	8	8	18	18	18	20	21
	Sandy	756	756	13.3	4.5	13.3	13.3	11.8	10.0	9	9	9	10	11	37	37	37	41	46
	No Site	1,065	1,065	14.8	N/A	14.8	14.8	13.2	11.1	8	8	8	9	10	47	47	47	52	58

TABLE 2-2 (continued)

RESPONSES OF VEGETATION TO THE PROPOSED ACTION AND ALTERNATIVES (LONG TERM)

Vegetative Type & MLRAs	Range Site	Acres: Public Acres	Acres: Total Acres	Grazing Capacity AC/AUM: EE /4	Potent /1	PA /4	LA	PCL/ ESR	NG	Density (%): EE /4	PA /4	LA	PCL/ ESR	NG	Cover (%): EE /4	PA /4	LA	PCL/ ESR	NG
Saltbush, WP-2	Bottomland	5,338	9,924	10.6	0.7	6.3	7.4	5.6	5.6	7	12	11	13	10	16	25	22	28	22
	Loamy	6,179	11,759	13.9	3.0	5.8	7.9	5.2	5.9	7	13	11	14	11	15	22	20	24	20
	Sandy	907	2,428	8.9	3.5	8.9	8.9	7.9	6.7	8	8	8	9	9	15	15	15	17	16
Saltbush, WP-3	Bottomland	85	436	106.7	0.5	106.7	106.7	95.0	80.0	1	1	1	1	1	6	6	6	7	6
	Loamy	3,333	6,307	12.0	2.5	4.1	6.2	3.6	4.6	10	17	15	19	15	23	32	29	35	30
	Sandy	0	1,272	13.0	2.9	13.0	13.0	11.6	9.8	7	7	7	8	7	11	11	11	12	11
	Shallow	422	627	14.0	3.5	14.0	14.0	12.5	10.5	7	7	7	8	8	14	14	14	16	16
	No Site	438	1,058	5.3	N/A	5.3	5.3	4.7	4.0	15	15	15	17	16	33	33	33	36	36
Saltbush TOTAL		24,447	43,947																
AVERAGE				16.02	2.89	11.58	12.74	10.31	9.55	8	11	11	13	11	19	24	22	26	24
Winterfat, CP	Limestone Hills	97	97	4.6	9.3	4.6	4.6	4.1	3.5	14	14	14	16	17	47	47	47	52	58
Winterfat, WP-2	Loamy	622	1,490	8.8	3.0	7.1	7.5	6.3	5.7	12	15	14	17	14	23	34	31	37	29
Winterfat, WP-3	Gravelly	219	220	26.7	1.5	14.9	18.0	13.3	13.5	5	8	7	9	9	14	20	18	22	23
	Malpais	233	233	4.9	2.6	4.9	4.9	4.4	3.7	13	13	13	14	16	13	13	13	14	16
	Shallow	356	356	9.1	3.5	9.1	9.1	8.1	6.8	12	12	12	13	15	16	16	16	18	20
Winterfat TOTAL		1,527	2,396																
AVERAGE				9.94	3.15	7.80	8.33	6.94	6.30	12	14	13	15	14	21	29	26	31	27
Desert Shrub, CP	Bottomland	0	211	5.8	0.7	4.0	4.5	3.6	3.4	11	14	13	16	11	21	24	23	27	21
	Gypsum	77	473	8.4	10.9	5.3	6.1	4.7	4.6	10	12	11	13	11	23	25	24	28	24
	Gypsum Hills	721	882	249.7	7.5	249.7	249.7	222.2	187.3	3	3	3	3	4	28	28	28	31	33
	Hills	2,121	3,466	17.8	3.7	17.8	17.8	15.9	13.4	12	12	12	13	14	24	24	24	27	28
	Limestone Hills	335	344	8.0	9.3	8.6	8.4	7.7	6.3	13	14	14	16	17	51	60	57	67	71
	Loamy	6,962	16,230	11.1	4.6	9.3	9.8	8.3	7.3	10	11	11	12	11	25	26	26	29	28
	Malpais	1,952	2,177	7.3	3.5	7.3	7.3	6.5	5.5	9	9	9	10	11	28	28	28	31	34
	Sandy	1,018	1,686	5.5	3.4	3.8	4.2	3.4	3.2	13	17	16	19	17	19	30	27	33	28
	Shallow	9	76	5.4	3.6	5.4	5.4	4.8	4.1	13	13	13	14	13	33	33	33	36	34
	No Site	6	340	41.7	N/A	41.7	41.7	37.1	31.3	2	2	2	2	2	7	7	7	8	7
Desert Shrub, SD	Bottomland	0	188	11.9	1.2	11.9	11.9	10.6	8.9	9	9	9	10	9	23	23	23	26	23
	Deep Sand	4,158	4,214	41.4	5.5	41.4	41.4	36.8	31.1	8	8	8	9	9	23	23	23	26	26
	Gypsum	4,879	7,918	19.0	12.2	19.0	19.0	16.9	14.3	8	8	8	9	9	16	16	16	18	18
	Gravelly	8,482	10,851	50.6	11.1	39.5	42.4	35.2	31.8	7	7	7	8	8	48	49	49	55	58
	Limestone Hills	3,066	3,768	12.9	7.0	12.9	12.9	11.5	9.7	9	9	9	10	11	54	54	54	60	65
	Loamy	7,026	8,364	8.0	4.4	8.0	8.0	7.1	6.0	11	11	11	12	12	27	27	27	30	30
	Sandy	27,937	41,298	10.3	4.5	6.2	7.3	5.5	5.4	11	14	13	16	15	25	31	29	34	33
	No Site	4,625	7,209	54.3	N/A	50.4	51.4	44.9	38.6	5	5	5	6	6	37	37	37	41	43
Desert Shrub, WP-2	Basalt Hills	68	1,143	6.5	1.9	6.5	6.5	5.8	4.9	10	10	10	11	10	36	36	36	40	37
	Loamy	2,533	10,771	8.0	3.0	5.6	6.2	5.0	4.7	11	14	13	16	12	25	31	29	34	29
	Malpais	9,463	21,819	7.7	2.6	5.9	6.4	5.3	4.8	10	12	11	13	11	34	43	40	48	28
	Sandy	460	1,420	12.3	3.5	12.3	12.3	10.9	9.2	7	7	7	8	8	17	17	17	19	18
	Shallow Sandstone	0	7	10.0	4.4	10.0	10.0	8.9	7.5	10	10	10	11	10	46	46	46	51	46

TABLE 2-2 (continued)

RESPONSES OF VEGETATION TO THE PROPOSED ACTION AND ALTERNATIVES (LONG TERM)

Vegetative Type & MLRAs	Range Site	Acres: Public Acres	Acres: Total Acres	Grazing Capacity AC/AUM: EE /4	Potent /1	PA /4	LA	PCL/ ESR	NG	Density (%): EE /4	PA /4	LA	PCL/ ESR	NG	Cover (%): EE /4	PA /4	LA	PCL/ ESR	NG
Desert Shrub, WP-3	Basalt Hills	1,949	2,867	7.9	1.9	8.1	8.1	7.2	6.0	8	8	8	9	9	10	10	10	11	12
	Gravelly	0	33	4.0	1.5	4.0	4.0	3.6	3.0	17	17	17	19	17	57	57	57	63	57
	Hills	3,119	3,202	5.6	2.1	3.0	3.7	2.7	2.8	12	16	15	18	18	44	40	41	45	51
	Limestone Hills	186	370	18.3	3.5	18.3	18.3	16.3	13.7	5	5	5	6	6	50	50	50	55	56
	Loamy	7,617	12,415	14.1	2.5	9.2	10.5	8.2	7.9	9	13	12	14	12	33	37	36	41	40
	Malpais	1,444	3,708	10.0	2.6	10.0	10.0	8.9	7.5	8	8	8	9	9	32	32	32	35	35
	Shallow	1,142	1,231	9.1	3.5	6.8	7.4	6.1	5.5	13	16	15	18	18	24	16	18	18	23
	No Site	462	709	27.9	N/A	27.9	27.9	24.8	20.9	15	15	15	17	17	49	49	49	55	57
Desert Shrub TOTAL		101,817	169,390																
AVERAGE				17.50	4.62	14.17	14.93	12.62	11.19	10	11	11	13	12	29	33	32	36	34
Half Shrub, CP	Hills	0	160	5.4	3.7	5.4	5.4	4.8	4.1	14	14	14	16	14	20	20	20	22	20
	Loamy	101	101	50.0	4.6	50.0	50.0	44.5	37.5	5	5	5	6	6	8	8	8	9	10
Half Shrub, SD	Loamy	1,633	1,681	11.3	4.4	11.3	11.3	10.1	8.5	13	13	13	14	16	40	40	40	45	49
	Sandy	1,204	1,609	40.5	4.5	40.5	40.5	36.0	30.4	6	6	6	7	7	13	13	13	14	15
Half Shrub, WP-2	Loamy	321	616	26.7	3.0	26.7	26.7	23.8	20.0	11	11	11	12	12	34	34	34	37	38
Half Shrub, WP-3	Hills	71	200	14.7	2.1	14.7	14.7	13.1	11.0	12	12	12	13	13	48	48	48	53	52
Half Shrub TOTAL		3,330	4,367																
AVERAGE				25.07	4.11	25.07	25.07	22.31	18.82	10	10	10	11	11	28	28	28	31	33
GRAND TOTALS		858,985	1,323,301																
OVERALL AVERAGE /2		/3	/3	23.12	5.37	17.87	19.27	15.98	14.45	8	11	10	12	11	37	40	39	45	45

/1 Potential represents the ultimate vegetative grazing capacity, density, and cover possible on the range site. Potential was calculated from SCS Range Site Guides. These guides represent large areas and are not always completely applicable to this area. Values shown in this column are sometimes greater than Existing Environment (EE) and/or the Alternatives. We feel that the potential will at least always equal No Grazing (NG).
/2 Density and cover averages were rounded to nearest whole numbers.
/3 Will not equal Chapter 1 acreage figures because of rounding.
/4 Under the No Action Alternative vegetation on the 25 existing AMPs would respond as predicted for the Proposed Action (PA). Vegetation on the 96 non-AMP allotments would be maintained at the Existing Environment (EE) level.

EE - Existing Environment
Potent - Potential
PA - Proposed Action
LA - Livestock Adjustment Alternative
PCL - Pasture Capacity Level Alternative
ESR - Enhancement of Sensitive Resource Values Alternative
NG - No Grazing Alternative

Source: Range Survey, Socorro County Soil Survey, Methodologies (Appendix 2, p. A-38), SCS Range Site Guides

ceives some water run-in; and 3) a tall grass represented by giant dropseed on deep sand sites or sacaton on overflow sites.

Short-Grass Subtype

Black grama is the characteristic short grass found on good condition sites in the SD MLRA (Figure 2-2). Such sites are found on some sandy range sites within allotments 272 and 293. It is also the dominant species found on north-facing slopes on gravelly range sites within most allotments along the Rio Grande. It has been selected as the key species in these areas. Vigorous black grama stands on sandy range sites within allotments 251, 284, and 301 and other CP-designated allotments illustrate that it can also tolerate cooler, more moist sites. As conditions change from the more xeric and thermic SD MLRA to the more mesic and cooler CP and WP MLRAs, the dominant grass changes from black grama to blue grama. Blue grama is common on allotment 275 where it is a major species on loamy and limestone hills range sites. This relationship is also true in the northwestern portion of the area where blue grama is generally the dominant species in the juniper understory. Thus, blue grama is the key species in these areas.

Galleta occurs on residual soils formed over limestone, sandstone, basalt, volcanic cinders, and on alluvial soils. It seldom occurs on gypsum and deep sand soils.

Tobosa is another short grass prominent on allotment 293 where it occurs on inclusions in the malpais range site. These inclusions are swales characterized by deep, fine textured soils which receive run-in water from adjacent sites. Tobosa also grows in small remnant patches on some bottomland range sites on allotment 275. Tobosa was not found in the CP or WP portion of the area. Some additional common short-grass species are: ring muhly, bush muhly, three-awn, wolftail, pappusgrass, sand dropseed, spike dropseed, mesa dropseed, and purple muhly.

Mid-Grass Subtype

The characteristic mid-grass is alkali sacaton (Figure 2-3). It is found in all MLRAs, with the best stands occurring on bottomland range sites. Alkali sacaton is the key species in these areas. Good examples of the sacaton type can be seen on allotments 289 and 301. Alkali sacaton is also common on the deep clay loam of valleys in the Mesa del Oro region. These soils are generally Moriarty clays or La Fonda-Moriarty association. As range condition declines on these mid-grass sites, alkali sacaton tends to be replaced by burrograss, ear muhly, and annual forbs (cocklebur, bitterweed, hog potato, and Russian thistle). This retrogression is evident on allotment 114.

Tall-Grass Subtype

In the tall-grass subtype giant dropseed is the characteristic indication of a deep sand site. Representative sites are on allotment 285 in the SD MLRA and allotment 301 in the CP MLRA. Sacaton is a tall grass which indicates a bottomland site. Representative stands can be seen on the Anway fine sandy loam on allotment 275.

An important component of all three grass subtypes is the cool- or warm-season tendencies of the plants. Cool-season plants grow early in the spring and warm-season plants grow in the summer. This diversity is important because together they make a more complete use of their environment. This differentiation of vegetation into units with diverse ecologies favors a more complete utilization of environmental resources.

Cool-season grasses are estimated to make up less than 2 percent of the vegetative composition. Common species are: New Mexico feathergrass, needle and thread, southwestern needlegrass, squirreltail, western wheatgrass, and Indian ricegrass. Sixweeks fescue is a common annual, while sacaton and three-awn often express cool-season tendencies. Southwestern needlegrass occurs on limestone outcrops, western wheatgrass on sandy bottomlands, and Indian ricegrass is restricted to sandy soils. Squirreltail occurs as isolated plants throughout the ES Area in widely varying habitats.

Barren

One stretch of the Rio Salado channel and flood plain was typed as barren because very little vegetation grows on this site. Also, few acres were typed as barren on the vertisol soil in allotment 293. Most of this barren type, however, is found on allotment 016. The type covers 922 acres in total. Soils within this type have largely been classified into the Riverwash association and have not been included in range sites.

Runoff from summer storms apparently acts as a scouring agent and makes seedling establishment and survival very difficult. However, small stands of saltcedar have become established in some areas. Small isolated communities of saltgrass, saltbush, sacaton, and cottonwoods were included in this type when it was mapped.

Broadleaf Trees

The broadleaf deciduous type occurs in the area as thin ribbons along the major drainages. It covers 14,869 acres (about 1 percent) of the vegetation surveyed. Most of the type is in intermittent drainages cutting through wide valley bottoms (i.e., the Canada Bonita disecting a bottomland range site on allotment 016). The broadleaf

Figure 2-1. Juniper and blue grama characterize the pinyon-juniper type (T. 5 S., R. 6 E., Sec. 26).

Figure 2-2. Black grama characterizes a gravelly range site in the grass type (T. 7 S., R. 4 W., Sec. 24).

tree type was classified into two subtypes, broadleaf tree and bosque.

Broadleaf Tree Subtype

The broadleaf tree subtype is an important component of the landscape. It offers biological and recreational values. Most of this subtype is in the WP-3 MLRA. The subtype is well developed where the Arroyo Colorado cuts through the La Fonda-Moriarty and Moriarty clays on allotment 129 and where the Canada Bonita cuts through allotment 016.

This subtype is generally dominated by saltcedar and is interspersed with scattered cottonwood. Cottonwood apparently requires a streamflow or underflow to complete its life cycle. Saltbush is the most common understory shrub along the Rio Salado and actually forms nearly pure stands along some stretches. These stands occur on allotment 016 and along Alamocito Creek. Saltcedar has a competitive advantage over saltbush and cottonwood and appears to be encroaching on many sites. Other species in this subtype which are often present in the rocky-gravelly stream channels are brickellbush and burrobrush. Perennial grasses include: alkali sacaton, vine mesquite, western wheatgrass, and saltgrass.

Bosque Subtype

The 'bosque' riparian habitat occurs along the Rio Grande (Figure 2- 4). This acreage once resembled the habitat Carothers and Johnson (1971) and Horton and Campbell (1974) recognize as being important for non-game bird habitat. Thompson (1968) explains that due to unique and favorable habitat, riparian vegetation supports a fauna disproportionate to the limited acreage. Jahn and Trefethen (1972) consider riparian vegetation to be the most valuable wildlife habitat in Arizona. The continuous ribbons of 'bosque' riparian habitat found along the drainages from the United States into Mexico are especially important because they serve as migratory routes for birds (Horton and Campbell, 1974). Most of the native cottonwood and willow which once dominated the 'bosque' has been replaced by the invader, saltcedar.

Perennial Forbs

The perennial forb type is located on allotment 114 and covers 107 acres. It is found on Mesa del Oro in the intermittent lake bottoms (Laguna Bonita and Laguna del Oro). These bottoms occur as inclusions in a loamy range site. Blueweed makes up 90 percent of the botanical composition. It is a native, noxious weed that grows in dense colonies 1 to 2 feet high. Although blueweed is relatively unpalatable, associated species (western wheatgrass and squirreltail) have some value as forage for livestock.

Half-Shrub

The half-shrub type covers approximately 4,367 acres (less than one percent) of the vegetation surveyed. The ES Area has two half-shrub subtypes. They are the snakeweed subtype and the hairy coldenia subtype.

Snakeweed Subtype

Snakeweed is the most common half-shrub type and is found on the sandy and loamy range sites. The common grass species are black grama, galleta, burrograss, and alkali sacaton. Some of the shrub species of the desert shrub type are also associated with the snakeweed subtype.

Hairy Coldenia Subtype

Hairy coldenia is found on allotments 264, 289, and 325. It grows on gypsum range sites. Gyp dropseed is the dominant grass. In areas with slightly deeper soils some of the common grasses are fluffgrass, black grama, galleta, and the dropseeds. The major shrubs are hairy coldenia, snakeweed, and Mormon tea.

Creosote

Creosote occurs on most allotments in the SD MLRA but only on a few allotments in the CP and WP MLRAs. It is one of the most extensive vegetative types, covering 211,783 acres (approximately 16 percent) of the vegetation surveyed.

The creosote type dominates the gravelly range site in the SD MLRA (Figure 2-5). Creosote is an invader species. For example, on allotment 252 creosote has invaded the sandy range site and on allotment 272 it has invaded a loamy site.

Within this type the dominant shrub species are creosotebush, American tarbush, and snakeweed. Associated shrub species are Mormon tea and mesquite.

Common grasses include fluffgrass, three-awn, the dropseeds, bush muhly, black grama, and galleta. Black grama and galleta are often found on north-facing slopes. Bush muhly, another common grass, is often restricted to the shelter of the shrubs where they are protected from grazing animals.

The creosote type has a high proportion of annuals which contribute to this type's grazing capacity. Some of the common annuals are annual snakeweed, common bahia, buckwheats, spectacle pod, sixweeks grama, sixweeks three-awn, and windmill grass.

Figure 2-3. Alkali sacaton characterizes a bottomland range site in the grass type.

Figure 2-4. The bosque riparian vegetative type occurs along the Rio Grande (T. 10 S., R. 3 W., Sec. 4).

Winterfat

Winterfat type is valuable for grazing, although it only covers 2,396 acres (less than one percent) of the vegetation surveyed. Winterfat is found on allotments 077, 114, 263, and 275. It is usually found on loamy, shallow, and malpais range sites. Common shrubs are bigelow sagebrush and snakeweed. Blue grama, black grama, galleta, ring muhly, sand dropseed, and squirreltail are the common grasses.

Waste

Approximately 7,988 acres (less than one percent) of the vegetation surveyed is classified as waste. This type is unusable for livestock, although it is valuable for wildlife and other resources. These areas are usually rock outcrops, steep slopes, or mesa tops. Portions of D-Cross Mountain and Ladron Peak are examples of this type.

Saltbush

The saltbush type is found on terraces and flood plains along the Rio Salado, Rio Puerco, and Rio Grande drainages (Figure 2-6) and in some of the smaller drainages. The saltbush type dominates approximately 43,947 acres (roughly 3 percent) of the vegetation surveyed. It is usually on loamy range sites; however, in the WP-2 MLRA a large type was mapped on a clayey bottomland.

The major shrub species is four-wing saltbush. Jones saltbush and shadscale are found in small isolated areas. Other shrubs include broom snakeweed, cholla, desert olive, wolfberry, and mesquite. Common grasses are mesa dropseed, sand dropseed, spike dropseed, alkali sacaton, sacaton, galleta, three-awn, and fluffgrass.

Mountain Shrub

The mountain shrub type is uncommon in this area and is valuable wildlife habitat. It covers approximately 192 acres of allotment 301 and grows on a limestone hills range site. The dominant shrub, hairy mountain mahogany, can also be found on other allotments. Common grasses of this type are purple muhly, hairy grama, and three-awn.

Mesquite

The mesquite type covers approximately 25,359 acres (2 percent) of the vegetation surveyed. It is generally found on sandy range sites in the SD MLRA (Figure 2-7). Mormon tea, snakeweed, four-wing saltbush, and sand sage are the common shrubs. A variety of grasses occurs on this type. Some of the common ones are black grama, fluffgrass, galleta, and the dropseeds.

Sagebrush

The sagebrush type covers 71,452 acres (about 5 percent) of the vegetation surveyed. The type is dominated by sand sagebrush, a strong indicator of loose sandy soil. Most of the sagebrush type is in the SD MLRA. It occurs on sandy sites on allotments 272, 285, and 293 (Figure 2-8). It also occurs on allotments 251, 275, 284, and 301 in the CP MLRA. Dropseeds and black grama are the most common grasses. Snakeweed is a common half-shrub, and yucca is a common shrub.

The Soil Conservation Service (SCS) Range Site Guides state that sand sage, saltbush, winterfat, snakeweed, and feather peabush should total 5 percent of the production in a climax community in the SD and CP MLRAs. Because sand sage frequently represents from 20 to 30 percent of the composition on sandy sites (allotment 285), it is believed that sand sage has increased on many sites. This increase is described in York and Dick-Peddie's (1969) report and suggests that range condition has dropped below the excellent and good condition classes.

Desert Shrub

The desert shrub type is an extensive, widespread, and variable vegetative type. It covers some 169,390 acres (approximately 13 percent) of the vegetation surveyed. It contains six different subtypes. They are yucca, spicebush, cholla, Mormon tea, broom dalea, and little-leaf sumac. Most of the desert shrub is in the SD MLRA, but large acreages are also in other MLRAs.

Yucca Subtype

Yucca is usually found on sandy range sites. On allotment 293 a large, solid, aesthetic tract of soaptree yucca, of approximately 3,200 acres, is being proposed to be managed as a botanical natural area. Black grama, galleta, three-awn, and the dropseeds are the most common grasses. The dominant shrub is yucca, with snakeweed and Mormon tea being other common shrubs.

Spicebush Subtype

Spicebush is a unique and uncommon desert shrub type. It is found on allotments 260 and 271. This subtype is found in rocky canyons or on stony slopes in the SD MLRA. Common grasses are black grama, bush muhly, burrograss, blue grama, and galleta. Mariola, snakeweed, and four-wing saltbush are associated shrubs.

Cholla Subtype

Cholla is the largest, most common, and most widespread of the desert shrub subtypes. It occurs on numerous allotments in all MLRAs. It is

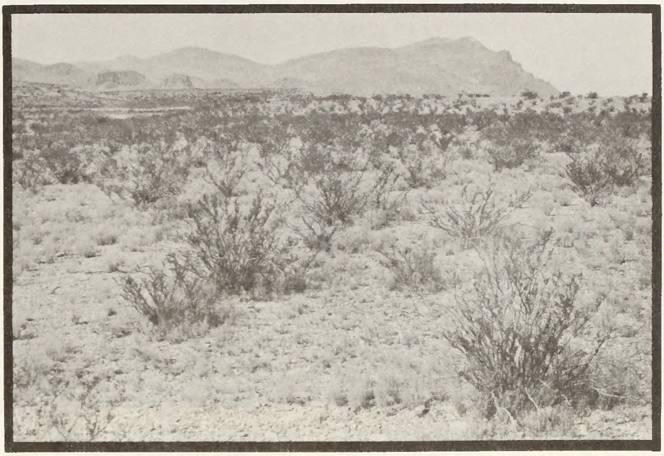


Figure 2-5. Creosote characterizes a gravelly range site in the SD MLRA (T. 3 S., R. 1 W., Sec. 25).

Figure 2-6. Four-wing saltbush dominates the saltbush type on loamy range sites in the WP-2 and WP-3 MLRAs.

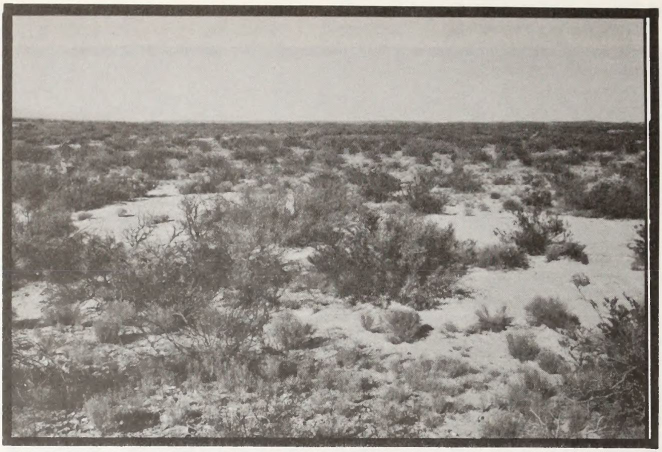


Figure 2-7. Mesquite characterizes the mesquite type on a poor condition sandy range site (T. 4 S., R. 1 E., Sec. 27).

Figure 2-8. Sand sagebrush characterizes the sagebrush type (T. 5 S., R. 4 E., Sec. 14).

found on loamy and sandy range sites (Figure 2-9). Even though this subtype is widespread, it has a uniform vegetative composition. Cholla and snakeweed are the major shrub and half-shrub species, respectively. Of the many grass species found, black grama, blue grama, galleta, burrograss, and the dropseeds are the most common. In the SD MLRA black grama is the dominant grass, whereas blue grama is dominant in the more mesic and cooler CP and WP MLRAs.

Mormon Tea Subtype

Mormon tea grows on sandy and gypsum range sites. It is especially adapted to the Yesum-Holloman association which is characterized by a sandy surface and gypsum subsurface. Mormon tea often has a stunted appearance in this situation. It is usually associated with snakeweed, sand sage, hairy coldenia, and apache-plume. Black grama, fluffgrass, and the dropseeds are the major grasses.

Broom Dalea Subtype

Broom dalea is a desert shrub type that occurs on deep sandy soil. It grows together with mesquite, snakeweed, sand sage, and little-leaf sumac. The common grasses are fluffgrass and the dropseeds. Occasionally, Indian ricegrass is found on the broom dalea subtype in the northernmost portion of the ES Area.

Little-Leaf Sumac Subtype

Little-leaf sumac is found on sandy range sites or on pockets of deep sand included in gravelly, gypsum, or limestone hills range sites. The common grasses are fluffgrass and the dropseeds. Snakeweed and mesquite are the associated shrub species.

KEY SPECIES

Key species are forage species whose use serves as an indicator to the degree of use of asssociated species. They were identified in the ES Area by AMP writers during development of AMPs. Table 2-3 lists the key species in each vegetative type by range site. The phenology of the key species are summarized in Figure 2-10.

UNIQUE RIPARIAN AREAS

There are six perennial stream reaches, several perennial springs, and one marsh (800 acres) in the ES Area. Each of the stream reaches is less than two miles long. Typical vegetation along these perennial stream reaches is shown in Figure 2-11.

The Elephant Butte Marsh, even though it is located within the bosque type, supports a flora and fauna which distinguishes it from any other area in New Mexico (Hundertmark, 1973). The unique riparian areas within the ES Area are summarized in Table 2-4.

THREATENED OR ENDANGERED PLANTS

Spellenberg Consultants (1977), under contract with the BLM Socorro District Office, have explored the possibility of the existence of proposed threatened or endangered (T or E) plant species as listed in the July 1, 1975 and July 16, 1976 issues of the Federal Register. Their exploration has entailed a literature search, herbaria searches, and an on-site survey for T or E plant species. Spellenberg Consultants (1977) found in their literature and herbaria searches that 17 or 18 proposed T or E species (depending on the interpretation of the status of marsh sunflower, *Helianthus praetermissus*) had some potential of occurring in the ES Area. Six of the species were found in the area (Spellenberg Consultants, 1977). Table 2-5 lists the 18 species and summarizes their status.

The New Mexico State Heritage Program (correspondence to BLM Socorro District Office dated July 27, 1977) lists four additional species of plants which they feel should be studied to determine if they merit consideration as T or E plants. They are:

Ladron spiderwort (*Tradescantia ladronensis*)
Amsonia (*Amsonia* sp.)
Pecos bladderpod (*Lesquerella praecos*)
Vernal thelypody (*Thelypodium vernale*)

Ladron spiderwort (*Tradescantia ladronensis*) was described as a new species. Spellenberg, however, has studied the plant and feels it is not a new species. He identifies it as Wright's spiderwort (*Tradescantia wrightii*) (correspondence to BLM Socorro District Office dated October 3, 1977). Spellenberg has also collected and studied Amsonia (*Amsonia* sp.). Its status remains uncertain. He feels it may be a subspecies or variety of *A. hirtella* (correspondence dated 1977). Spellenberg (1976) concluded from his searches that 'no other plant species recorded from this area might be considered to be unique or rare.'

RANGE CONDITION

Range condition is the present state of vegetation on a range site in relation to the climax (natural potential) plant community for that site (SCS, 1976). Range condition in the ES Area is shown on Map 2-3 and summarized in Table 2-6. The range condition methodology is discussed in Appendix 2, p. A-40. An allotment breakdown is shown in Table A-6 (Appendix 2, p. A-41).

RANGE TREND

'Range trend is the direction of change in range condition' (Society of Range Management, 1974).

TABLE 2-3

OCCURRENCE OF KEY SPECIES IN TEN VEGETATIVE TYPES*, AND THEIR RELATIONSHIP TO SIXTEEN RANGES

Range Site	Vegetative Type: Grassland	Sagebrush	Mountain Shrub	Pinyon-Juniper	Broadleaf	Creosote	Mesquite	Saltbush	Winterfat	Desert Shrub
Bottomland Total Ac. 49,351	Sacaton Galleta			Sacaton	Saltbush Sacaton			Sacaton Saltbush		Dropseeds Black grama
Basalt Hills Total Ac. 37,314	Blue grama Galleta									
Hills Total Ac. 88,845	Blue grama Galleta			Black grama Galleta		Black grama Galleta				Black grama
Malpais Total Ac. 71,034				Blue grama Black grama						Black grama Galleta
Shallow Total Ac. 50,559	Blue grama Black grama			Blue grama Black grama						
Loamy Total Ac. 255,042	Black grama Galleta	Black grama		Galleta Black grama	Saltbush Sacaton	Black grama Blue grama		Saltbush Sacaton		Galleta Black grama
Sandy Total Ac. 194,082	Dropseeds Galleta	Black grama Dropseeds		Black grama Dropseeds		Galleta Black grama	Dropseeds Saltbush	Galleta Saltbush		Dropseeds Black grama
Sandstone Hills Total Ac. 4,833										
Shallow Sandy Total Ac. 749										
Shallow Sandstone Total Ac. 18,287										
Deep Sand Total Ac. 37,536		Dropseeds Saltbush		Galleta Saltbush			Dropseeds			
Gravelly Total Ac. 259,974	Black grama Galleta			Black grama Blue grama		Black grama Galleta	Black grama		Galleta Winterfat	
Gypsum Hills Total Ac. 15,662										
Limestone Hills Total Ac. 131,766	Blue grama Black grama		Mountain Mahogany	Black grama Blue grama		Blue grama Galleta				
Igneous Hills Total Ac. 7,710										
Gypsum Total Ac. 47,127				Black grama Blue grama						Dropseeds Black grama
No Site Total Ac. 53,430										
1,323,301**	260,434	71,452	192	510,095	14,869	211,783	25,359	43,947	2,396	169,390

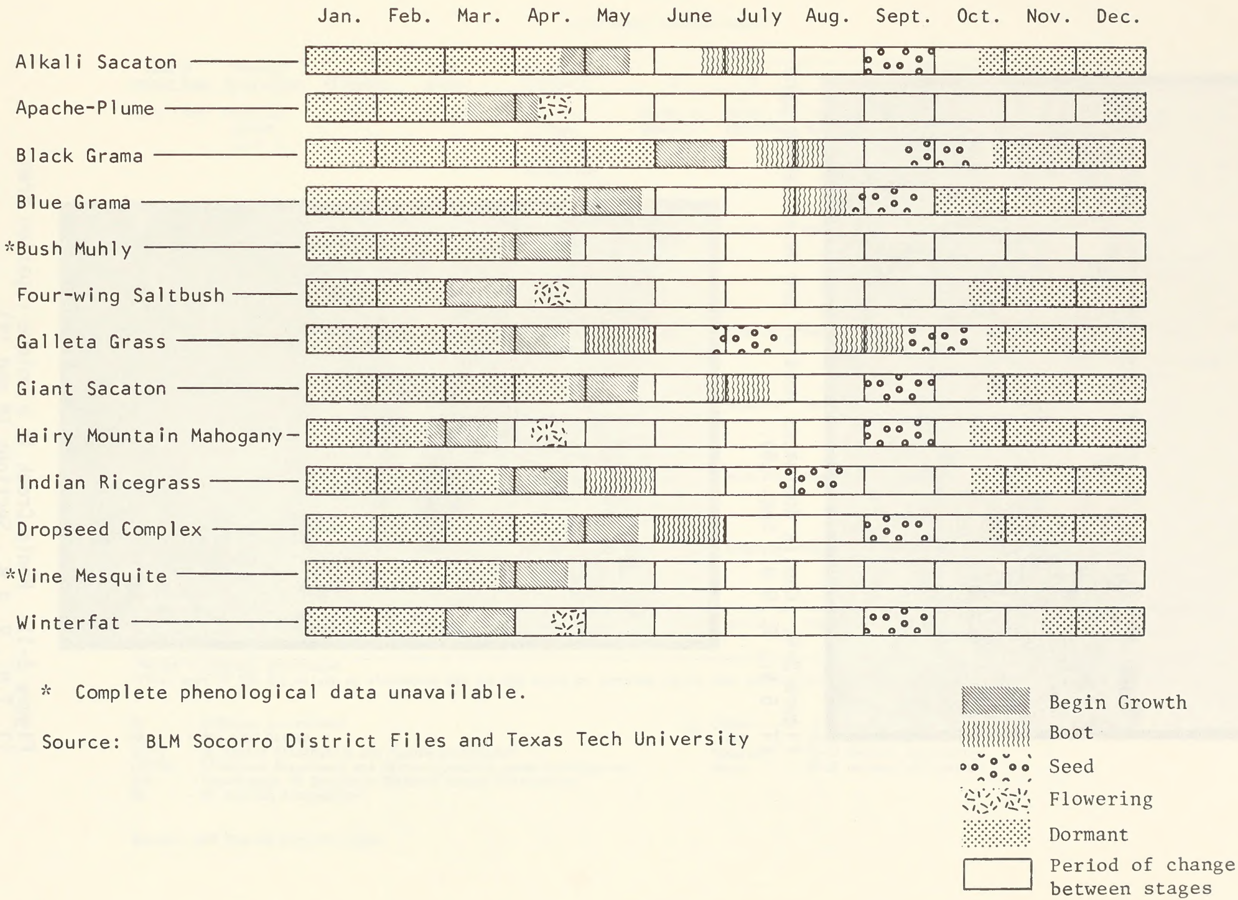
*Key areas were not located in four vegetative types. These types and respective acreages were: Waste, 7,988; Barren, 922; Half-shrub, 4,367, and Perennial forb, 107.

**Will not equal Chapter 1 acreage figures because of rounding.

Source: Proposed AMPs, Socorro County Soil Survey, Socorro District

FIGURE 2-10

PHENOLOGICAL DEVELOPMENT FOR KEY SPECIES



* Complete phenological data unavailable.

Source: BLM Socorro District Files and Texas Tech University

Figure 2-9. Cholla dominates most of the desert shrub type (T. 5 N., R. 5 W., Sec. 18).

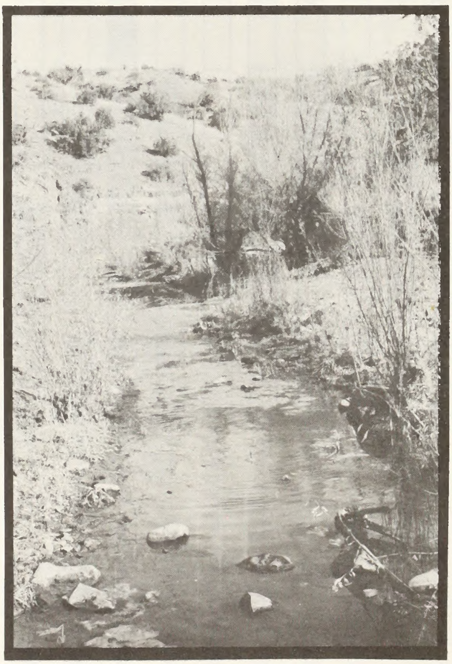


Figure 2-11. Ponia Creek is a unique riparian area (T. 7 N., R. 4 W., Sections 18 and 19).

TABLE 2-4

SEVEN UNIQUE RIPARIAN AREAS*

Name of Unique Area	Physical Description	Allotment	Land Status	Biological Importance	Livestock Utilization /1 EE	PA	NA/FE	LA/PCL	ESR	NG
Ponia Creek	Perennial stream (1 mi.)	065	Private	Cattails, willows, flathead minnow, Rio Grand Chub (mountain lion sighting)	Slight to moderate	Slight to moderate	Slight to moderate	Slight to moderate	Slight to moderate	Slight to moderate
Mesa Carrizo Streams	Perennial streams (4 mi.)	002	Private and Public	Unknown	Moderate	Moderate	Moderate	Moderate	Moderate About 2 mi. would not be grazed	1) Private land-moderate 2) Public land would be ungrazed.
Rio Salado	Perennial springs & seeps	012,016, 059	Private and Public	Unknown	Heavy	Moderate	Heavy	Moderate	Moderate and ungrazed**	1) Private land-heavy 2) Public land would be ungrazed.
Arroyo Colorado	Several Artesian (alkaline)	129	Private	Unknown	Heavy	Moderate	Moderate	Moderate	No livestock use	Heavy
Las Canas Spring	Spring	287	Private	Unknown	Heavy	Moderate	Moderate	Moderate	No livestock use	Heavy
Ojo Saladito	Perennial stream (1 mi.)	006	Private	Unknown	Heavy	Moderate	Heavy	Moderate	Moderate	Heavy
Elephant Butte Marsh	Marsh (800 ac.)	277	Bureau of Reclamation	Rookery-Cormorant Heron	Slight to heavy	Slight to moderate	Slight to heavy	Slight to moderate	No livestock use	No livestock use

*Water is present year-round.
**That part of the Rio Salado on allotments 016 and 059 would be ungrazed; while that part on allotment 012 would be moderately grazed.

EE - Existing Environment
PA - Proposed Action
NA/FE - No Action Alternative and Future Environment
LA/PCL - Livestock Adjustment and Pasture Capacity Level Alternatives
ESR - Enhancement of Sensitive Resource Values Alternative
NG - No Grazing Alternative

/1 Slight = 0-20 percent utilization
Light = 20-40 percent utilization
Moderate = 40-60 percent utilization
Heavy = 60-80 percent utilization

Source: BLM Socorro District Files

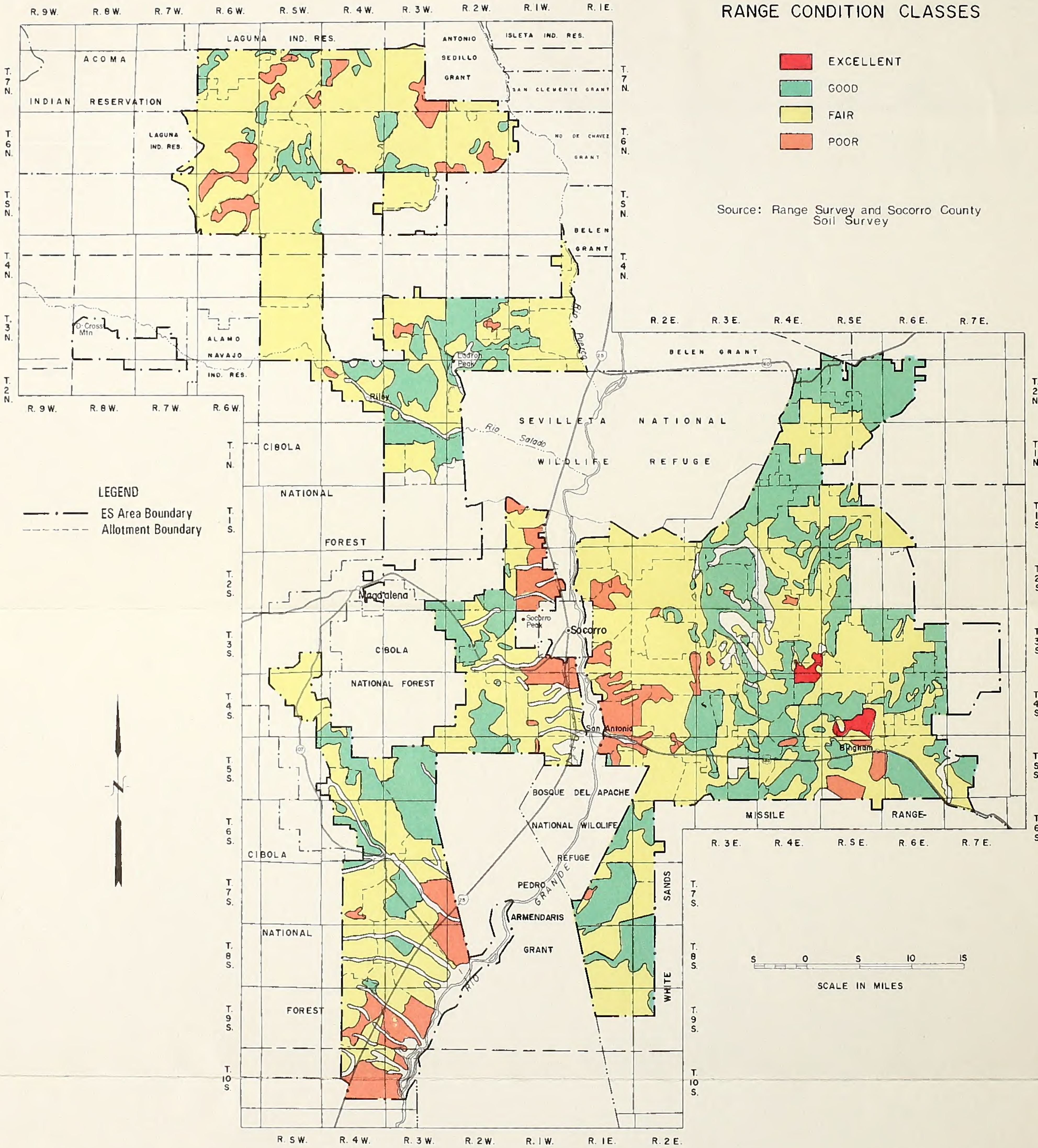
TABLE 2-5

PROPOSEO THREATENED OR ENDANGEREO PLANT SPECIES IN ES AREA

Species	Presence in ES Area	Specific Habitat	Impacts PA NA/FE LA PCL ESR NG
Marsh parsley *Aletes filifolius*	Verified	Mesic Canyon and Slope	Unknown
Pricklepoppy *Argemone pleiacantha ssp. pinnatisecta*	Possible Occurrence		Unknown
Zuni milkvetch *Astragalus accumbens*	Possible Occurrence	Sacramento Mountains	Unknown
Castetter Milkvetch *Astragalus castetteri*	Possible Occurrence	Limestone, 5,000-6,000 ft.	Unknown
Flintmountain milkvetch *Astragalus siliceus*	Possible Occurrence	Quartz Outcrop	Unknown
Multistem beeplant *Cleome multicaulis*	Possible Occurrence	Alkaline Areas	Unknown
Mogollon Oraba *Oraba mogollonica*	Possible Occurrence	Mesic Canyon	Unknown
Rhizome Fleabane *Erigeron rhizomatous*	Possible Occurrence	Chinle Clay (McKinley County)	Unknown
Cutleaf Sunflower *Helianthus laciniatus spp. crenatus*	Possible Occurrence	Moist Spots	Unknown
Paradox Sunflower *H. paradoxus*	Possible Occurrence	Marsh	Unknown
Marsh Sunflower *H. praetermissus*	Possible Occurrence	Marsh	Unknown
Sealavender *Limonium limbatum*	Verified	Moist Alkaline Areas	No livestock grazing No effect
Grama cactus *Pediocactus papyracanthus*	Possible Occurrence	Blue Grama Sites	Unknown
Rock Oaisy *Perityle staurophylla*	Possible Occurrence	Limestone Cliffs	Unknown
Sandy Prairieclover *Petalostemum scariosum*	Verified	Sandy Areas	No livestock grazing No effect
Oesert Rose *Rosa stellata*	Verified	Mesic Canyon	No livestock grazing No effect
Scarlet figwort *Scrophularia coccinea*	Possible Occurrence	Mesic Canyon	Unknown
Plank's silene *Silene plankii*	Verified	Igneous Cliffs	Inaccessible to livestock

PA - Proposed Action
NA/FE - No Action Alternative and Future Environment
LA - Livestock Adjustment Alternative
PCL - Pasture Capacity Level Alternative
ESR - Enhancement of Sensitive Resource Values Alternative
NG - No Grazing Alternative

Source: Spellenberg Consultants, 1977



MAP 2-3. Range Condition Classes

TABLE 2-6

SUMMARY OF RANGE CONDITION CLASSES FOR THE LONG TERM

Range Condition	EE	PA	NA/FE	LA	PCL/ESR	NG
Excellent						
Public	3,410	20,814	7,587	17,333	31,720	31,256
Other	3,676	10,258	5,256	8,942	14,383	14,207
Total	7,086	31,072	12,843	26,275	46,103	45,463
% Total	1	2	1	2	4	4
% Change	-	+338	+81	+271	+551	+542
Good						
Public	232,046	251,010	236,597	247,217	262,895	262,389
Other	87,761	102,614	91,325	99,643	111,931	111,525
Total	319,807	353,624	327,922	346,860	374,816	373,914
% Total	24	27	25	26	28	28
% Change	-	+11	+3	+8	+17	+17
Fair						
Public	484,904	454,637	477,640	460,691	435,670	436,478
Other	285,796	267,658	281,443	271,285	256,292	256,775
Total	770,700	722,295	759,083	731,976	691,962	693,253
% Total	58	55	58	56	53	53
% Change	-	-6	-2	-5	-10	-10
Poor						
Public	81,350	75,249	79,886	76,469	71,425	71,588
Other	43,956	40,659	43,165	41,319	38,593	38,681
Total	125,306	115,908	123,051	117,788	110,018	110,269
% Total	10	9	9	9	8	8
% Change	-	-8	-2	-6	-12	-12
No Range Condition Class /2						
Public	59,657	59,657	59,657	59,657	59,657	59,657
Other	35,591	35,591	35,591	35,591	35,591	35,591
Total	95,248	95,248	95,248	95,248	95,248	95,248
% Total	7	7	7	7	7	7
% Change	-	0	0	0	0	0
Public Acres	861,367	861,367	861,367	861,367	861,367	861,367
Other Acres	456,780	456,780	456,780	456,780	456,780	456,780
GRAND TOTALS /1	1,318,147	1,318,147	1,318,147	1,318,147	1,318,147	1,318,147

/1 Does not include 332,067 acres of private and State land in non-AMP areas.

/2 These are areas where SCS has not developed range site guides. This is because these areas are low producing sites such as badlands, steep slopes, and river washes. In addition, a small amount of acreage was included because a soil survey was not completed.

EE - Existing Environment
PA - Proposed Action
NA/FE - No Action Alternative and Future Environment
LA - Livestock Adjustment Alternative
PCL - Pasture Capacity Level Alternative
ESR - Enhancement of Sensitive Resource Values Alternative
NG - No Grazing Alternative

Source: Tables A-6 and A-18 in Appendix 2

It is 'a separate determination that is necessary for assessing what is currently happening to the plant community' (SCS, 1976). Because management differs on each allotment, trend reflects both current and past management practices; therefore, trend must be analyzed on an allotment-by-allotment basis. Ideally, range trend requires at least two sets of readings, preferably 5 to 10 years apart. As shown on Table A-6 (Appendix 2, p. A-41), 68 percent of the ES Area is presently in poor and fair range condition. This indicates that trend has generally stablized at a less than desirable range condition. Socorro District personnel determined apparent range trend on 23 allotments during 1977. Trend was estimated to be static on 19 allotments, down on 3, and up on 1. Therefore, for the purpose of this analysis, range trend is assumed to be stable (Appendix 2, p. A-44).

VEGETATIVE POTENTIAL

The Proposed Action and alternatives can be analyzed in greater detail if there is some level in which to compare the existing and predicted vegetative parameters. This is possible by using the SCS Method of identifying range sites and analyzing the existing vegetation and making a comparison to the climax or potential community which the site could produce (Appendix 2, p. A-44). The potential community is the highest ecological development of a plant community capable of perpetuation under the existing climatic and edaphic conditions (SCS, 1976). There is no time frame associated with the potential community. Table A-18 (Appendix 2, p. A-58) summarizes the potential vegetative AUMs by allotment. Potential productivity for each soil in the ES Area is presented in Column P of Table 2-8. The values shown on Table 2-8 were taken from the SCS soils Form 5's for normal years.

Future Environment

On the 25 existing AMP allotments average density would increase from the existing level of 8 to 11 percent, and average cover would increase from 37 to 40 percent. Average density would change from 6 to 13, 8 to 10, 7 to 8, and 10 to 11 percent on grass, pinyon-juniper, creosote, and desert shrub vegetative types, respectively. Average cover would change from 30 to 35, 41 to 44, 56 to 57, and 29 to 33 percent on grass, pinyon-juniper, creosote, and desert shrub vegetative types, respectively. Density and cover are not expected to increase on non-AMP allotments, because under this alternative the proposed grazing systems and adjustments would not be implemented.

The percent composition of the key species would increase on the 25 existing AMP allotments. The increase by individual species would range from 2 to 10 percent. On the non-AMP allotments composition is expected to remain unchanged because there would be no livestock adjustment or new grazing systems implemented.

Vegetative production would increase 38 percent on the 25 existing AMP allotments, from 31,972 to 44,018 AUMs. On the non-AMP allotments production would remain at the existing level, 102,925 AUMs. The total change would be a 9-percent increase from 134,942 to 146,988 AUMs. In the short term 90 acres would be disturbed by range developments. In the long term 67 acres would not be available for vegetative production because of range developments. This would occur only on the 25 existing AMP allotments as there would be no range development construction on non-AMP allotments.

Impacts

DENSITY AND COVER

The combination of livestock adjustments and the effects of the proposed grazing systems on AMP allotments would cause vegetative density and cover to increase in the long term. Grazing systems would allow for systematic deferment of pastures. These periods of non-use would promote plant vigor, increase seed production, and increase seedling establishment. The livestock adjustments would lower the percent of forage utilization. This would allow more plants to complete their life cycle and would encourage increased reproduction. A lower percentage of utilization would allow plants to remain vigorous. The overall average improvements in density and cover are shown in Table 2-2. These increases are based on key and comparison area data (Appendix 2, p. A-47).

Small increases in density result in large increases in production. This can be illustrated by using the data and formula on Figure A-3, p. A-12, and the Existing Environment and the long-term Proposed Action average density values.

Example:

Existing Environment Average Density equals 8 percent.

Average Proper Use Factor (.395) times Existing Environment Average Density (8 percent) equals Forage Acre Factor (.032) times Percent Utilization (100 percent) equals Net Forage Acre Factor (.032); Forage Acre Requirement (.25) divided by Net Forage Acre Factor (.032) equals Acres per AUM (7.8).

Predicted Long-Term Proposed Action Average Density equals 11 percent.

Average Proper Use Factor (.395) times Long-Term Proposed Action Average Density (11 percent) equals Forage Acre Factor (.043) times Percent Utilization (100 percent) equals Net Forage Acre Factor (.043); Forage Acre Requirement (.25) divided by Net Forage Acre Factor (.043) equals Acres per AUM (5.8).

640 Acres divided by Existing Acres per AUM (7.8) equals 82 AUMs.

640 Acres divided by Predicted Long-Term Acres per AUM (5.8) equals 110 AUMs.

Therefore, the increase in production from 82 to 110 AUMs per section is 34 percent.

The predicted increases in density and cover are realistic because they approach the overall average response reported in published research from many parts of the western ranges. These studies, however, demonstrate variability. For example, Gifford and Hawkins (1976) concluded that all grazing systems affect litter and cover similarly. However, Martin (1973) found that grass density increased 36 percent under rotational, rather than yearlong, grazing. Another study (Reardon and Merrill, 1976) reported that there is more litter on pastures grazed in a rotational system than on pastures grazed yearlong. Herbage response, however, is inconsistent in the Southwest. Examples occurred in southern Arizona when perennial grasses did not significantly increase with summer (July through October) non-use during three out of four summers (Martin, 1973); grass density increased significantly on ranges rested 44 to 67 percent of the time (Martin and Ward, 1976); and perennial grasses fared poorly on ranges grazed in winter and best on those grazed yearlong (Martin, 1970). This indicates the difficulty in predicting exactly how density and cover would respond with implementation of grazing systems. Martin's (1973) and Reardon and Merrills' (1976) studies suggest that density and cover would increase when grazing systems are implemented.

The same variation appears in the literature when density and cover data is related to grazing intensity. Hazel (1968) reported that, occasionally, there is no correlation between grazing intensity and cover. However, Paulsen (1954, cited in Pond, 1957) found that grazing intensity eventually affects density and composition. This is apparent in the Intermountain Region. Here cover decreased by 8.4 percent when the vegetation was utilized at a 30-percent level (Stoddart, 1963). When utilization was 90 percent, cover decreased by 34.6 percent (Stoddart, 1963). He also found that a 75-percent forage removal was significantly more harmful than a 50-percent level of forage removal. In contrast, heavy grazing caused plant cover to increase on blue grama ranges in the Northern Plains (Smoliak, Dormaar, and Johnston, 1972). Vegetation in the ES Area should respond more like vegetation in the Intermountain Region than vegetation in the Northern Plains.

Density and cover should increase in the ES Area when grazing systems are implemented and livestock numbers are adjusted. This would be a long-term, area-wide impact.

Proposed Action - As the proposed grazing systems are implemented on AMP allotments and utilization decreases from heavy (60 to 80 percent) to moderate (40 to 60 percent), the average total density would increase from the existing level of 8 to 11 percent; and average cover would increase from 37 to 40 percent. Average density in the major vegetative types would change from 6 to 13, 8 to 10, 7 to 8 and 10 to 11 percent on grass, pinyon-juniper, creosote, and desert shrub vegetative types, respectively. Average cover would change from 30 to 35, 41 to 44, 56 to 57, and 29 to 33 percent on grass, pinyon-juniper, creosote, and desert shrub vegetative types, respectively. Density and cover are not expected to increase on non-AMP allotments, because public lands are intermingled with other lands; these areas will not have intensive management and normally grazing use is not closely supervised.

No Action Alternative - As the proposed grazing systems are implemented on the 25 existing AMP allotments and utilization decreases from heavy (60 to 80 percent) to moderate (40 to 60 percent), the average total density would increase from the existing level of 8 to 11 percent, and average total cover would increase from 37 to 40 percent. Average density in the major vegetative types would change from 6 to 13, 8 to 10, 7 to 8, and 10 to 11 percent on grass, pinyon-juniper, creosote, and desert shrub vegetative types, respectively. Average cover would change from 30 to 35, 41 to 44, 56 to 57, and 29 to 33 percent on grass, pinyon-juniper, creosote, and desert shrub vegetative types, respectively. Density and cover are not expected to increase on non-AMP allotments, because under this alternative the proposed grazing systems and adjustments would not be implemented. Conditions would remain as they are in the Existing Environment.

Livestock Adjustment Alternative - As the proposed grazing systems are implemented on the 25 existing AMP allotments and utilization decreases from heavy (60 to 80 percent) to moderate (40 to 60 percent), the average total density would increase from the existing level of 8 to 11 percent, and average total cover would increase from 37 to 39 percent. Average density would change from 6 to 14, 8 to 10, 7 to 7, and 10 to 11 percent on grass, pinyon-juniper, creosote, and desert shrub vegetative types, respectively. Average cover would change from 30 to 33, 41 to 43, 56 to 57, and 29 to 32 percent on grass, pinyon-juniper, creosote, and desert shrub vegetative types, respectively. Density and cover are not expected to increase on non-AMP allotments, because public lands are intermingled with other lands; these areas will not have inten-

sive management and normally grazing use is not closely supervised.

Pasture Capacity Level Alternative - As the proposed grazing systems are implemented on AMP allotments and utilization decreases from heavy (60 to 80 percent) to light (20 to 40 percent), the average total density would increase from the existing level of 8 to 12 percent, and average total cover would increase from 37 to 45 percent. Average density would change from 6 to 14, 8 to 11, 7 to 9, and 10 to 13 percent on grass, pinyon-juniper, creosote, and desert shrub vegetative types, respectively. Average cover would change from 30 to 39, 41 to 49, 56 to 64, and 29 to 36 percent on grass, pinyon-juniper, creosote, and desert shrub vegetative types, respectively. Density and cover are not expected to increase on non-AMP allotments because public lands are intermingled with others lands; these areas will not have intensive management and normally grazing use is not closely supervised.

Enhancement of Sensitive Resource Values Alternative - As the proposed grazing systems are implemented on AMP allotments and utilization decreases from heavy (60 to 80 percent) to light (20 to 40 percent), the average density would increase from the existing level of 8 to 12 percent, and average cover would increase from 37 to 45 percent. Average density would change from 6 to 14, 8 to 11, 7 to 9, and 10 to 13 percent on grass, pinyon-juniper, creosote, and desert shrub vegetative types, respectively. Average cover would change from 30 to 39, 41 to 49, 56 to 64, and 29 to 36 percent on grass, pinyon-juniper, creosote, and desert shrub vegetative types, respectively. Density and cover are not expected to increase on non-AMP allotments, because public lands are intermingled with other lands; these areas will not have intensive management and normally grazing use is not closely supervised.

No Grazing Alternative - Because there would be no grazing on public lands, average density would increase from the existing level of 8 to 11 percent, and cover would increase from 37 to 45 percent. Average density would change from 6 to 13, 8 to 11, 7 to 9, and 10 to 12 percent on grass, pinyon-juniper, creosote, and desert shrub vegetative types, respectively. Average cover would change from 30 to 37, 41 to 49, 56 to 68, and 29 to 34 percent on grass, pinyon-juniper, creosote, and desert shrub vegetative types, respectively. On the State and private lands density and cover are not expected to change.

VEGETATIVE COMPOSITION

The combination of livestock adjustments and the effects of the proposed grazing systems on AMP allotments would cause vegetative composition to improve toward a higher successional stage. This improvement is based on key and comparison area data (Appendix 2, p. A-47). This increase would result in higher grazing capacities as desirable forage plants replace less desirable ones (Table 2-7). Small increases in composition result in large increases in grazing capacities. This is shown below where individual key species composition changes of 5 percent result in a 55 percent increase in grazing capacities with all other factors remaining constant.

1. By using proper use factors of 55 for black grama, 50 for mesa dropseed, 5 for fluffgrass, 10 for three-awn, 50 for four-wing saltbush and 1 for broom snakeweed and the following changes in composition: black grama from 5 to 10 percent, mesa dropseed from 10 to 15 percent, fluffgrass from 10 to 5 percent, three-awn from 10 to 5 percent, four-wing saltbush from 5 to 10 percent, and broom snakeweed from 10 to 5 percent, the total average proper use factor for Existing Environment and predicted long term would be .119 to .189, respectively. Figure A-3, (Appendix 2, p. A-12), illustrates how total average proper use factors are calculated.

2. The grazing capacities for both examples are figured using the formula shown at the bottom of Figure A-3, p. A-12.

Existing Environment Average Proper Use Factor equals .119.

Existing Average Proper Use Factor (.119) times Existing Environment Average Density (10 percent) equals Forage Acre Factor (.012) times Percent Utilization (100 percent) equals Net Forage Acre Factor (.012); Forage Acre Requirement (.25) divided by Net Forage Acre Factor (.012) equals Acres per AUM (20.8).

Predicted Long-Term Average Proper Use Factor equals .189.

Predicted Long-Term Average Proper Use Factor (.189) times Average Density (10 percent) equals Forage Acre Factor (.019) times Percent Utilization (100 percent) equals Net Forage Acre Factor (.019); Forage Acre Requirement (.25) divided by Net Forage Acre Factor (.019) equals Acres per AUM (13.2).

3. The increase in AUMs is shown as follows:

640 Acres divided by Existing Acres per AUM (20.8) equals 31 AUMs.

640 Acres divided by Predicted Acres per AUM (13.2) equals 48 AUMs.

Therefore, the increase in grazing capacity from 31 AUMs to 48 AUMs per section is 55 percent. Vegetative composition is not expected to improve on non-AMP allotments, because the public lands are unfenced and intermingled with other lands; these areas will not have intensive management and normally grazing use is not closely supervised.

The predicted improvement in composition is realistic because it is similar to the improvement reported in published research from many parts of

TABLE 2-7

THE PROPOSED ACTION WOULD CAUSE THE KEY SPECIES TO INCREASE*

Range Site	Species (Predicted Increases in Percent Composition)
Bottomland	Sacaton 4, Galleta 5, Black grama 5, Dropseeds 5
Hills	Blue grama 2, Galleta 1, Black grama 5
Shallow	Blue grama 3, Black grama 8
Loamy	Black grama 3, Galleta 3, Saltbush 2, Sacaton 7
Sandy	Dropseeds 6, Black grama 4
Deep Sand	Dropseeds 2, Galleta 10
Gravelly	Black grama 3, Galleta 2
Limestone Hills	Blue grama 4, Black grama 6, Galleta 5
Gypsum	Black grama 5, Blue grama 3, Dropseeds 5

* These predictions are based on key and comparison area data. AMP writers predicted no changes on the remaining range sites.

Source: Proposed and Existing AMPs, Socorro District

the western ranges. However, these studies demonstrate the variability associated with composition data. For example, Reardon and Merrill (1976) found that in Texas decreaser plants increased significantly when pastures were grazed in rotation rather than yearlong. In Colorado, Hanson, Love, and Morris (1931) found that desirable plants increased by 18 percent when pastures were rotationally grazed. Many authors (Hubbard, 1951; Anderson, 1967; Hormay, 1956; Woolfolk, 1960; Martin, 1966; and Dillon, 1958), some of which are in Shiflet and Heady (1971), stated improvement in range condition occurred with rest rotation; but because of differences in site productivity and complexities within grazing systems, there were other results. In Shiflet and Heady's (1971) literature review, Biswell (1951) had a decrease in range condition under rotational grazing. A review of 39 studies of vegetative responses under different grazing systems compared to continuous grazing showed: 31 had improved vegetation, 5 had no significant change, and 3 had a decrease in range condition (Driscoll, 1967). Herbel, Steger, and Gould (1974) suspected that yearlong grazing was detrimental because they reported that black grama (a warm-season species) was best grazed during winter and droughty spring. This would allow it to increase because of the non-use during the summer growing season. Though it is difficult to predict the exact composition changes when grazing systems are implemented in the ES Area, most research does suggest increases in the composition of key species.

The same relationship is observed in the literature when composition is related to grazing intensity. Although most literature suggests that heavy use decreases the desirable component of the vegetative community, some does not. This is especially true after the potential community has been interrupted and partially replaced by a lower successional stage. For example, Jerry Dodd (per. comm., 1977) stated that blue grama range on the Pawnee grasslands did not change in composition regardless of grazing intensities. Vegetative composition in the Northern Great Plains is also relatively stable under heavy grazing (Black, Baker, Clark, and Mathews, 1937; cited in Peterson, 1962). However, Heady (1975) cited a study describing increases of all preferred plants as grazing pressures lightened. Overuse resulted in loss of vigor; then, ultimately, in the disappearance of the desirable plants (Heady, 1975). Smoliak, Dormaar, and Johnston (1972) found that shallow-rooted species replaced the deeper-rooted species with heavy use. Vegetation in the ES Area should respond to the reduced level of livestock grazing much like vegetation responded in the published literature. Overall vegetative composition should improve when grazing systems are implemented and livestock numbers are adjusted. This improvement would occur in AMP areas and is based on key and comparison area data. It would be a long-term, area-wide impact. It would be unmeasurable in the short term.

Proposed Action - The predicted increases in percent composition for key species range from 2 to 10 and are summarized by range site in Table 2-7. This results from the implementation of the proposed grazing systems and livestock adjustments.

No Action Alternative - The percent composition of the key species would increase on the 25 existing AMP allotments. The increase by individual species would range from 2 to 10 percent. On the non-AMP allotments composition is expected to remain unchanged, because there would be no livestock adjustments or new grazing systems implemented.

Livestock Adjustment Alternative - Although there is an expected change in composition, lack of data prevents the quantification of this impact.

Pasture Capacity Level Alternative - Although there is an expected change in composition, lack of data prevents the quantification of this impact.

Enhancement of Sensitive Resource Values - Although there is an expected change in composition, lack of data prevents the quantification of this impact.

No Grazing Alternative - Although there is an expected change in composition, lack of data prevents the quantification of this impact.

VEGETATIVE PRODUCTION

Plant responses to proper stocking rates and the proposed grazing systems would cause total vegetative production to increase. The most important plant responses that would cause an increase in production are improved plant vigor, increased vegetative density, and a change in plant composition or an increase in key forage species.

Plant vigor is the relative well-being and health of a plant as reflected by its ability to manufacture sufficient food for growth and maintenance. Grazing any time during the growing period of plants reduces the amount of food made and stored by the plants. This reduction, in turn, decreases the plants' capacity to produce both shoot and root growth the following season (Hormay, 1970). In the ES Area continuous yearlong use decreases the plants' ability to make and store food and, therefore, reduce plant vigor. Vigor or health determines a plants' size or robustness. As plants are periodically rested and allowed to produce and store more food, they become healthier. These larger, healthier plants lead to an increase

in height and total forage production of individual plants even when density and composition are not affected.

The number of individual plants per unit of area or plant density affects the quantity or total vegetative production of any given area. As plants become healthier and more vigorous, they produce more seed or are more likely and able to reproduce vegetatively. As a result, more plants would become established per unit area in the ES Area. This increased plant density results in increased production due to more plants being present per unit area.

Plant composition is the percentage each species occupies in the plant community. The proposed grazing systems are designed to meet the physiological needs of the more desirable forage or key species. An increase in composition of key forage species will result in the ES Area as vigor improves (as previously discussed). This, in turn, results in increased density (or more plants per unit area) of the key species.

Proper stocking and the non-use periods in the proposed grazing systems on AMP areas would improve plant vigor, increase the number of established plants, increase accumulated litter (vegetative density), and increase the percentage composition of key species. These individual plant responses would cause total vegetative production to increase (Table 2-2). The projected increase is based on key and comparison area data (Appendix 2, p. A-47). Overall improvement in grazing capacity is indicated when the average acreage required to support an AUM decreases (Table 2-2). The largest increases would occur on loamy and gravelly range sites. Production is not expected to increase on non-AMP areas because the public lands are unfenced and intermingled with non-public lands; these areas will not have intensive management and normally grazing use is not closely supervised.

The predicted increases in herbage production for the Proposed Action and alternatives are realistic because they are similar to the overall average increases reported in published research from many parts of the western ranges. However, these studies demonstrate the variability associated with production data and grazing systems. For example, Black and Clark (1942) found that production on the Great Plains did not increase when grazing systems were implemented. But Martin (1973) found that perennial grass production on the Santa Rita Experimental Station was three and one-half times greater under rotational grazing than yearlong grazing. Indications of higher forage production were reported by Hormay (1955), Woolfolk (1960), Martin (1966), Johnson (1965), and many other authors. Therefore, it is difficult to predict exactly how much production would increase when grazing systems are implemented in the ES Area. The cited research, however, does suggest that production would increase with implementation of grazing systems.

The same variation appears in the literature when production data is related to grazing intensity. For example, forb production in Oklahoma increased in heavily grazed pastures (Hazell, 1968). Cook and Stoddart (1963) also found that grazing stimulates twig production on certain shrubs. Although production of shrubs can remain high under heavy use for a few years, vigor and production eventually decrease (Garrison, 1953). Most research has shown that heavy grazing is detrimental to vegetative production (Martin, 1970; Reardon and Merrill, 1976; Schmutz, 1973; Klipple and Costello, 1960; Heady, 1975; and Paulsen and Ares, 1961). Klipple and Bement (1961) cited a study on the west-central South Dakota midgrass ranges where heavy grazing reduced production over 400 pounds per acre, moderate grazing maintained yields, and light grazing increased production by more than 500 pounds per acre. Pond (1957) cited research in Colorado, on the Manitou Experimental Forest, where Arizona fescue production was 40-percent higher on lightly and moderately grazed range than on heavily grazed range. Stoddart et al (1975) also discussed a study in southern Idaho where heavily grazed pastures produced 83 percent of the average yearly production while moderately grazed pastures produced 114 percent. The majority of research generally states that production is lower under heavy grazing and higher under moderate grazing. Therefore, production should increase when grazing systems are implemented and livestock numbers are adjusted. This would be a long-term, area-wide impact. It would not be measurable in the short term. Table 2-2 shows the long-term vegetative response by range site and Table A-18 (Appendix 2, p. A-58) shows vegetative AUMs, in the long term, by allotment.

When range developments are constructed, vegetation on some acreage is removed or disturbed. This would lower total vegetative production. These short-term impacts would recover through natural succession. The area occupied by range developments would not be available for vegetative production. This would be a long-term impact. Both long- and short-term impacts would be site specific although construction is proposed areawide. Table A-2 (Appendix 1, p. A-18) shows the acreage disturbed by allotment while Table 1-4 summarizes the acreage not available for vegetative production in both the short and long terms. Range developments would improve livestock distribution and result in a more uniform utilization of

forage. The total AUMs lost because of new range developments would be insignificant in the ES Area. The increased grazing capacity that results from a more uniform use of forage cannot be quantified or separated from the total vegetative response.

Proposed Action - As plant vigor improves and plants become larger and healthier, average vegetative density increases from 8 to 11 percent, and composition of key species increases, vegetative production would increase 38 percent on AMP allotments from 129,119 to 178,608 AUMs. On non-AMP allotments production would remain at the existing level, 5,778 AUMs. The total change would be a 37-percent increase from 134,942 to 184,488 AUMs. This would lower the average acres per AUM from 23.1 to 17.9. In the short term 580 acres would be disturbed by construction of range developments. In the long term 339 acres would not be available for vegetative production as the area would be occupied by range developments. There would not be any range development construction on non-AMP allotments.

No Action Alternative - As plant vigor improves and plants become larger and healthier, average vegetative density increases from 8 to 11 percent, and composition of key species increases, vegetative production would increase 38 percent on the 25 existing AMP allotments from 31,972 to 44,018 AUMs. On the remaining 96 non-AMP allotments production would remain at the existing level of 102,925 AUMs. The total change would be a 9-percent increase from 134,942 to 146,988 AUMs. In the short term 90 acres would be disturbed by range developments. In the long term 67 acres would not be available for vegetative production because of range developments. This disturbance would occur only on the 25 existing AMP allotments as there would be no range development construction on non-AMP allotments.

Livestock Adjustment Alternative - As plant vigor improves and plants become larger and healthier, average vegetative density increases from 8 to 10 percent, and composition of key species increases, vegetative production on AMP allotments would increase 31 percent from 129,119 to 168,931 AUMs. On non-AMP allotments total production would be the same as under the Existing Environment and Proposed Action, 5,778 AUMs. The total change would be a 30-percent increase from 134,942 to 174,811 AUMs. This would lower the average acres per AUM from 23.1 to 19.3. In the short term 90 acres would be disturbed by range developments. In the long term 67 acres would not be available for vegetative production because of range developments. This disturbance would occur only on the 25 existing AMP allotments as there would be no range development construction on non-AMP allotments.

Pasture Capacity Level Alternative - As plant vigor improves and plants become larger and healthier, average vegetative density increases from 8 to 12 percent, and composition of key species increases, vegetative production would increase 63 percent on AMP allotments from 129,119 to 210,712 AUMs. On non-AMP allotments production would remain at the existing level of 5,778 AUMs. The total change would be a 61-percent increase from 134,942 to 216,592 AUMs. The average acres per AUM would decrease from 23.1 to 16.0. In the short term 580 acres would be disturbed by range developments. In the long term 339 acres would not be available for vegetative production because of range developments. There would be no range development construction on non-AMP allotments.

Enhancement of Sensitive Resource Values Alternative - As plant vigor improves and plants become larger and healthier, average vegetative density increases from 8 to 12 percent and composition of key species increases, vegetative production would increase 67 percent, on AMP allotments from 129,119 to 216,118 AUMs. On non-AMP allotments production would increase less than one percent from 5,778 to 5,802 AUMs. The total change would be a 64-percent increase from 134,942 to 221,920 AUMs. The average acres per AUM would decrease from 23.1 to 16.0. In the short term 607 acres would be disturbed by range developments. In the long term 344 acres would not be available for vegetative production because of range developments. There would be no range development construction on non-AMPs.

No Grazing Alternative - Because there would be no grazing on public lands, vegetative production on AMP allotments would increase 59 percent from 129,119 to 205,411 AUMs. On non-AMP allotments production would increase from 5,778 to 10,823 AUMs. The total change would be a 60-percent increase from 134,942 to 216,336 AUMs. The average acres per AUM would decrease from 23.1 to 14.5. This increase would take place entirely on the public lands; production on State and private lands is not expected to change. In the short term 1,475 acres would be disturbed by range developments. In the long term 295 acres would not be available for vegetative production because of range developments.

UNIQUE RIPARIAN AREAS

Livestock adjustments and grazing systems would improve production, density, cover, composition, and condition in the seven unique riparian

areas. Improvements in production, density, cover, composition, and range condition cannot be quantified. Table 2-4 shows utilization expected for the Proposed Action and each alternative.

Proposed Action - Utilization would decrease from heavy to moderate on five areas and would remain at the present moderate level on Ponia Creek and Mesa Carrizo stream (Table 2-4). This would cause an unquantifiable improvement in production, density, cover, composition, and range condition.

No Action Alternative - Utilization would decrease from heavy to moderate on Ponia Creek, Arroyo Colorado Springs, and Las Canas Spring; these areas are within the 25 existing AMP allotments that would continue to be intensively managed (Table 2-4). The improvement would be unquantifiable. Because there would be no change on the non-AMP allotments, vegetative conditions of the other unique areas would not change.

Livestock Adjustment Alternative - Utilization would decrease from heavy to moderate on five areas and would remain at the present moderate level on Ponia Creek and Mesa Carrizo stream (Table 2-4). This would cause an unquantifiable improvement in production, density, cover, composition, and range condition.

Pasture Capacity Level Alternative - Utilization would decrease from heavy to moderate on five areas and would remain at the present moderate level on Ponia Creek and Mesa Carrizo stream (Table 2-4). This would cause an unquantifiable improvement in production, density, cover, composition, and range condition.

Enhancement of Sensitive Resource Values Alternative - On Ponia Creek utilization would continue to be moderate. On Ojo Saladito utilization would decrease from heavy to moderate. About one-half (2 miles) of the Mesa Carrizo streams and all of the Rio Salado except that portion on allotment 121 would be ungrazed. Utilization would decrease from heavy to moderate on the remaining part of Mesa Carrizo streams and that part of the Rio Salado occurring on allotment 121. Las Canas Spring and Elephant Butte Marsh would not be grazed under this alternative (Table 2-4). This would cause an unquantifiable improvement in production, density, cover, composition, and range condition.

No Grazing Alternative - Four areas, Ponia Creek, Arroyo Colorado Springs, Las Canas Spring, and Ojo Saladito, are totally on private land and would continue to be grazed as they presently are. There would be no improvement in vegetative conditions on these areas. Two areas, Mesa Carrizo Streams and Rio Salado, are located on both private and public lands. The portion of these areas on public land would be ungrazed. Use on the remainder would not change as grazing would continue at the present level. Elephant Butte Marsh would not be grazed under this alternative (Table 2-4).

THREATENED OR ENDANGERED PLANTS

Grazing systems and livestock reductions should not affect the plants that have been included in the proposed list of T or E plant species (Table 2-5). This belief is supported by Spellenberg's (1976) study which found some plants were inaccessible to livestock and others appeared to be undesirable for livestock use. The BLM Socorro District Office contacted the Fish and Wildlife Service (FWS) for their comments relating to T or E plants. They replied that a proposed list of T or E plants has been developed; but at this time, it has no legal status under the Endangered Species Act.

Construction would not be started until a survey for T or E plants is made. No construction would occur that would disturb or destroy any T or E plants.

Proposed Action - No impacts to T or E plants should occur.

No Action Alternative - No impacts to T or E plants should occur.

Livestock Adjustment Alternative - No impacts to T or E plants should occur.

Pasture Capacity Level Alternative - No impacts to T or E plants should occur.

Enhancement of Sensitive Resource Values Alternative - No impacts to T or E plants should occur.

No Grazing Alternative - No impacts to T or E plants should occur.

RANGE CONDITION

The existing range condition data and the vegetal increases predicted by the AMP writers were used as the basis for predicting future range condition. Changes in range condition result from changes in vegetative composition. Desirable forage plants replace less desirable ones as stated under the section on Vegetative Composition. This then is the basis for changes in range condition (Appendix 2, p. A-44).

Proposed Action - A total of 31,072 acres (2 percent) of the ES Area would be in excellent range condition class; this would be a 338-percent increase. A total of 353,624 acres (27 percent) would be in the good condition class, an 11-percent increase. A total of 722,295 acres (55 percent) would be in the fair condition class, a 6-percent reduction. A total of 115,908 acres (9 percent) would be in the poor condition class, an 8-percent reduction. A total of 95,248 acres (7 percent) would remain in the no condition class.

No Action Alternative - Range condition would improve on the 25 existing AMP allotments; on the 96 non-AMP allotments range condition would not change from the present. A total of 12,843 acres (1 percent) of the ES Area would be in excellent range condition class; this would be an 81-percent increase. A total of 327,922 acres (25 percent) would be in the good condition class, a 3-percent increase. A total of 759,083 acres (58 percent) would be in the fair condition class, a 2-percent reduction. A total of 123,051 acres (9 percent) would be in the poor condition class, a 2-percent reduction. A total of 95,248 acres (7 percent) would remain in the no condition class.

Livestock Adjustment Alternative - A total of 26,275 acres (2 percent) of the ES Area would be in excellent range condition class; this would be a 271-percent increase. A total of 346,860 acres (26 percent) would be in the good condition class; this would be an 8-percent increase. A total of 731,976 acres (56 percent) would be in the fair condition class; this would be a 5-percent reduction. A total of 117,788 acres (9 percent) would be in the poor condition class; this would be a 6-percent reduction. A total of 95,248 acres (7 percent) would remain in the no condition class.

Pasture Capacity Level Alternative - A total of 46,103 acres (4 percent) of the ES Area would be in excellent range condition class; this would be a 551-percent increase. A total of 374,816 acres (28 percent) would be in the good condition class; this would be a 17-percent increase. A total of 691,962 acres (53 percent) would be in the fair condition class; this would be a 10-percent reduction. A total of 110,018 acres (8 percent) would be in the poor condition class; this would be a 12-percent reduction. A total of 95,248 acres (7 percent) would remain in the no condition class.

Enhancement of Sensitive Resource Values Alternative - A total of 46,103 acres (4 percent) of the ES Area would be in excellent range condition class; this would be a 551-percent increase. A total of 374,816 acres (28 percent) would be in the good condition class; this would be a 17-percent increase. A total of 691,962 acres (53 percent) would be in the fair condition class; this would be a 10-percent reduction. A total of 110,018 acres (8 percent) would be in the poor condition class; this would be a 12-percent reduction. A total of 95,248 acres (7 percent) would remain in the no condition class.

No Grazing Alternative - A total of 45,463 acres (4 percent) of the ES Area would be in excellent range condition class; this would be a 542-percent increase. A total of 373,914 acres (28 percent) would be in the good condition class; this would be a 17-percent increase. A total of 693,253 acres (53 percent) would be in the fair condition class; this would be a 10-percent reduction. A total of 110,269 acres (8 percent) would be in the poor condition class; this would be a 12-percent reduction. A total of 95,248 acres (7 percent) would remain in the no condition class.

CUMULATIVE IMPACTS

Proposed Action - The average total vegetative density would increase from the existing level of 8 to 11 percent (37.5-percent change), and average total cover would increase from 37 to 40 percent (8.1-percent change). Total vegetative production would increase 37 percent from the range survey level of 134,942 to 184,488 AUMs. Excellent and good range condition would increase 4 percent from the existing level of 25 percent. This would be a long-term, area-wide impact.

No Action Alternative - On the 25 existing AMPs the average total vegetative density would increase from the existing level of 8 to 11 percent (37.5-percent change), and average total cover would increase from 37 to 40 percent (8.1-percent change). Density and cover are not expected to change from the existing level on the remaining 96 non-AMP allotments. Total vegetative production would increase 9 percent from the range survey level of 134,942 to 146,988 AUMs. Excellent and good range condition would increase 1 percent from the existing level of 25 percent. This would be a long-term, area-wide impact.

Livestock Adjustment Alternative - The average total vegetative density would increase from the existing level of 8 to 10 percent (25- percent change), and average total cover would increase from 37 to 39 percent (5.4-percent change). Total vegetative production would increase 30 percent from the range survey level of 134,942 to 174,811 AUMs. Excellent and good range condition would increase 3 percent from the existing level of 25 percent. This would be a long-term, area-wide impact.

Pasture Capacity Level Alternative - The average total vegetative density would increase from the existing level of 8 to 12 percent (50-percent change), and average total cover would increase from 37 to 45 percent (21.6-percent change). Total vegetative production would increase 61 percent from the range survey level of 134,942 to 216,592 AUMs. Excellent and good range condition would increase 7 percent from the existing level of 25 percent. This would be a long-term, area-wide impact.

Enhancement of Sensitive Resource Values Alternative - The average vegetative density would increase from the existing level of 8 to 12 percent (50-percent change), and average cover

would increase from 37 to 45 percent (21.6-percent change). Total vegetative production would increase 64 percent from the range survey level of 134,942 to 221,920 AUMs. Excellent and good range condition would increase 7 percent from the existing level of 25 percent. This would be a long-term, area-wide impact.

No Grazing Alternative - The average vegetative density would increase from the existing level of 8 to 11 percent (37.5-percent change), and average cover would increase from 37 to 45 percent (21.6- percent change). Total vegetative production would increase 60 percent from the range survey level of 134,942 to 216,336 AUMs. Excellent and good range condition would increase 7 percent from the existing level of 25 percent. This would be a long-term, area-wide impact.

Unavoidable Adverse Impacts

Vegetative production would be lost on acreage actually occupied by the range developments. This would affect less than 339 acres in the ES Area in the long term (Table 1-4).

SOILS

Existing Environment

A third order soil survey was completed in the ES Area during 1976- 78 and has not had final correlation. Table 2-8 shows mapping units and their component series along with some physical parameters for each of the series listed. Soils are grouped in the table on the basis of range sites and MLRAs (Visual C). The MLRAs are defined in the Vegetation Section of this chapter. Column P of Table 2-8 displays the potential productivity for each soil in pounds per acre dry weight.

The principal factors which determine a soil's susceptibility to wind and water erosion are physical soil properties, degree of slope, and amount of ground cover. Wind and water erosion are discussed separately.

WATER EROSION

Several factors (slope, permeability, restrictive layers, coarse fragments, soil texture, and vegetative cover) determine how susceptible a soil is to water erosion. Table 2-8 presents physical properties of soils in the ES Area, some of which influence erosion susceptibility. Table A-19 (Appendix 3, p. A-60) presents soils by range site groupings for each allotment.

Soil texture influences erosion susceptibility in several ways. Clay and organic matter act as binding agents which hold soil separates together to form aggregates. Soil aggregates are less susceptible to erosion. Soil texture also influences permeability. Sandy soils are generally more permeable than clayey soils and thus less susceptible to runoff losses.

Soil texture (surface and subsurface) would determine whether or not the soil surface would seal when impacted by falling raindrops. Soils with clayey surface horizons tend to seal shortly after precipitation starts, often causing high rates of runoff; while coarser soils would usually not seal. Soil textures are displayed in columns D and E of Table 2-8. Soils with medium to fine textures have higher sediment yields than the coarse textured soils. Soils in the bottomland, loamy, malpais, and shallow range sites have medium to fine textures and have sediment yields in the moderate and critical classes (Table 2-9). Coarse-textured soils, such as those in deep sand, sandy, and shallow sandy range sites, have the lowest sediment yields (most are in the slight sediment yield class).

The slope of a soil has a direct effect on erosion in that steep slopes are often unstable and are subject to high velocities of surface runoff. Slope ranges are displayed in Column I of Table 2-8.

Coarse fragments impede water erosion in two ways. On the soil surface they act as an armor which protects the soil from raindrop impact and runoff. They also increase soil permeability which decreases runoff. Soils in the gravelly range sites have the highest percentage of coarse fragments. Column J of Table 2-8 presents the percent coarse fragments for all the soils in the ES Area.

Restrictive layers are listed in Column N of Table 2-8. They include coarse fragments throughout the soil profile, gypsum, bedrock, calcic, and petrocalcic horizons. Petrocalcic horizons and bedrock prevent or retard the growth of roots and impede water penetration. High amounts of gypsum and calcium carbonate throughout the soil inhibit plant growth thus increasing the soil's susceptibility to erosion.

Vegetative cover, much like coarse fragments, protects the soil surface from raindrop impact and runoff. Roots help hold the soil in place. Plants add organic matter to the soil which binds the soil into aggregates thus improving soil structure.

Salinity (greater than 4 mmhos) is not considered a significant problem in the ES Area; only mapping unit 476, gypsiorthids (344 acres), indicates a possibility of high salinity values. A column in Table 2-8 was, therefore, not developed to identify salinity values.

The soil sediment yield class is a direct estimate of the erosion rate for a specific soil. Sediment yield classes presented in Table 2-9 and Map 2-4 are based on the Pacific Southwestern Inter-Agency Committee's (PSIAC) Method (1968) for estimating erosion. Sediment yield classes delineated are severe (greater then 3.0 acre-feet per

TABLE 2-8

PHYSICAL PARAMETERS OF SOILS

RANGE SITE Soil Mapping Unit and MLRA	A Major Mapping Unit Components	B % of Unit	C Acres Mapped Public	 Other	 Total	D Surface Texture Range & Depths	E Subsurface Texture Ranges & Depths
Basalt Hills							
484 Basalt Rock Outcrop	Rock Outcrop	45					
Orthents WP-2	Orthents	30	2,497	2,905	5,402	ST,VST,EXSTL & ST,VST,EXSTS (Variable)	
406 Cabezon-Apache-Rock Outcrop WP-3	Cabezon	35				0-3" STL	3-11" STCL
	Apache	30				0-4" STL	4-16" STL
	Rock Outcrop	25	3,513	1,707	5,220		
Bottomland							
420 Moriarty WP-2 & 3	Moriarty	75	1,964 248	2,491 1,065	4,455* 1,313**	0-6" C,SIC	6-60" C
421 Glenberg-Fluvents WP-2	Glenberg	55				0-4" FSL	4-60" Stratified L,FSL
	Fluvents	20	947	979	1,926	Unstable	
643 Marcial-Pajarito SD	Marcial	45				0-2" SICL	2-28" SICL, C 28-60" CL, L
	Pajarito	35	2,797	1,275	4,072	0-6" LFS	6-38" SL 38-60" SL
651 Mimbres SD	Mimbres	85	11,574	5,181	16,755	0-3" SIL	3-19" SIL 19-60" SIL,FSL,FS
724 Manzano CP	Manzano		2,628	4,414	7,042	0-5" SICL	5-37" SCL 37-60" SCL
755 Tours CP	Tours		1,785	5,010	6,795	0-6" FSL	6-60" L, CL
Deep Sand							
620 Bluepoint SD	Bluepoint	85	7,862	9,632	17,494	0-4" S	4-39" FS, GRS 39-60" S
640 Pintura SD	Pintura	90	14,074	1,165	15,239	0-10" FS	10-60" FS
644 Pintura-Yesum SD	Pintura	60				0-9" FS	9-60" FS
	Yesum	30	1,303	341	1,644	0-6" VFSL	6-60" SCL, SL
Gravelly							
440 Ildefonso-Clovis WP-3	Ildefonso	45				0-2" GRSL	2-11" GRSL 11-60" GR,VGRSL
	Clovis	30	2,666	282	2,948	0-4" FSL	4-26" SCL 26-60" FSL
441 Ildefonso WP-3	Ildefonso	45 30	14,450	9,522	23,972	0-2" GRL	2-22" VGRL, VGRSL 22-60" VGRSL
449 Ildefonso-Scholle WP-3	Ildefonso	45				0-4" GRSL	4-15" VGRL 15-60" VGRSL
	Scholle	30	13,909	4,062	17,971	0-5" GRL	5-27" GRCL 27-60" GRL

TABLE 2-B

PHYSICAL PARAMETERS OF SOILS

F Permeability of Most Restrictive Layer	G Available Water Capacity (in./in.)	H Drainage	I Slope %	J % Coarse Fragments (3 in.)	K WEG	L K	M Hydro-logic Group	N Restrictive Layer & Depth	O pH Range	P Pot. Prod. lbs./A
								Basalt Rock Outcrop		0
			25-100	15-90	B					***
0.6-2.0	0.13-0.15	Well	8-25	15-35	8	.20	D	Basalt Bedrock 11"		800
0.6-2.0	0.12-0.16	Well	5-15	15-35	B	.2B	D	Basalt Bedrock 16"		750
							D			0
.06	0.12-0.14	Well	0-5	0-15	4	.37	D	None		1,000
2.0-6.0	0.09-0.13	Well	0-5	0-25	3	.24	B	None	7.2-8.2	1,600
										***
0.06-0.2	0.04-0.12	Moderately Well	0-1	0-15	4L	.37	D	Gypsum 32"	7.2-8.6	500
2.0-6.0	0.13-0.15	Well	1-3	0-15	2	.17 .32	B	Gypsum 3B"		500
0.6-2.0	0.13-0.19	Well	1-3	0-15	6	.43 .28	C	None	7.6-8.B	1,800
0.2-2.0	0.19-0.21	Well	0-5	0-15	6	.2B	C	None		2,500
0.2-0.6	0.16-0.21	Well	1-3	0-15	3		B	None	7.6-B.2	2,500
6.0-20	0.07	Somewhat Excessively	1-5	0-35	2	.17	A	None		425
6.0-20	0.05-0.0B	Somewhat Excessively	1-3	0-15	2	.20	A	None	7.2	425
6.0-20	0.05-0.08	Somewhat Excessively	1-3	0-15	2	.20	A	None		425
0.6-2.0	0.0B-0.16	Well	1-3	0-15	2	.43	A	Gypsum at 6"		400
2.0-6.0	0.06-0.0B	Well	5-15	15-60	5	.15	B	Coarse Fragments Throughout - Cal.	7.8-B.6	1,050
0.6-2.0	0.13-0.20	Well	3-8	0-15	3	.24	B	None		750
2.0-6.0	0.06-0.0B	Well	B-15 15-30	15-60	5	.15	B	Coarse Fragments Throughout - Cal.		1,050
2.0-6.0	0.06-0.0B	Well	1-15	15-60	B	.15	B	15-60" Strongly Calcareous-Gravel Throughout		1,050
0.6-2.0	0.13-0.15	Well	1-8	15-35	7	.28	B	27-60" Strongly Calcareous-Gravel Throughout	7.2-9.2	1,050

TA8LE 2-8 (continued)

PHYSICAL PARAMETERS OF SOILS

RANGE SITE	A	8	C			D	E
Soil Mapping Unit and MLRA	Major Mapping Unit Components	% of Unit	Acres Mapped Public	Other	Total	Surface Texture Range & Depths	Subsurface Texture Ranges & Depths
451 Nehar WP-3	Nehar	60 25	898	2,371	3,269	0-5" GRL	5-26" VGRCL, C 26-60" COBL
622 Delnorte-Nickel SD	Delnorte	45				0-2" VGRL	2-12" VGRL 12-28" Indurated Caliche 28-60" EXGRLCOS LCOS, VGRLCOS
	Nickel	40	4,094	1,629	5,723	0-3" VGRFSL	3-60" VGRFSL,VGRS, EXGRLS
649 Nickel-Chamberino SD	Nickel	45				0-8" VGRSL	8-60" EXGRL VGRSL
	Chamberino	40	57,697	14,520	72,217	0-2" GRL	2-49" VGRL, EXGRL 49-60" EXGRS
650 Pinaleno SD	Pinaleno	85	10,468	1,309	11,777	0-2" GRSL	2-32" VGRSL 32-60" VGRSL
652 Caliza-Nickel SD	Caliza	45				0-3" VGRSL	3-48" GRSL, L 48-60" SCL
	Nickel	30	37,779	6,640	44,419	0-3" VGRSL	3-22" VGRCOSL 22-43" VGRLS, S 43-60" GRSL, LS
655 Nolam-Pinaleno SD	Nolam	45				0-4" GRSL	4-20" GRSCL,VGRSCL 20-60" VGRLCOS
	Pinaleno	35	17,633	11,132	28,765	0-4" VGRSL	4-24" GRL, EXGRSL 24-60" EXGRLS
749 Ildefonso CP	Ildefonso		4,168	2,224	6,392	0-3" GRFSL	3-10" GRL 10-60" VGRFSL,VGRL
Gypsum							
646 Holloman-Gypsum land SD	Holloman Gypsum land	55 30	6,599	2,619	9,218	0-6" L	6-60" Gypsum
736 Neeto-Deama-Harvey CP	Neeto Deama	35 30				0-2" L 0-3" GRL	2-8" L 3-13" VGRL
	Harvey	25	18,126	21,022	39,148	0-3" L	3-18" L 18-60" L
Gypsum Flats							
476 Gypsiorthids WP-2	Gypsiorthids	70	122	222	344	Var. Gypsum Crystals	
Gypusm Hills							
787 Gypsum land, Steep CP	Gypsum land, Steep		12,918	5,314	18,232	Gypsum	
Hills							
404 Santa Fe-Rock Outcrop WP-3	Santa Fe Rock Outcrop	55 30	18,434	6,769	25,203	0-7" COBL	7-14" COBCL
442 Luzena-Rock Outcrop WP-3	Luzena Rock Outcrop	50 25	18,868	7,262	26,130	0-3" C08L	3-18" GRSCL, C

TABLE 2-8 (continued)

PHYSICAL PARAMETERS OF SOILS

F Permeability of Most Restrictive Layer	G Available Water Capacity (in./in.)	H Drainage	I Slope %	J % Coarse Fragments (3 in.)	K WEG	L K	M Hydro-logic Group	N Restrictive Layer & Depth	O pH Range	P Pot. Prod. lbs./A
0.2-0.6	0.05-0.12	Well	15-25 8-15	15-60	8	.17	8	Coarse Fragments Throughout	7.2-8.6	1,050
0.6-2.0	0.06-0.12	Well to Excessively	1-20	0-90	8	.10	C	12-28" Indurated Caliche-Coarse Fragments Throughout	7.2-8.4	375
2.0-6.0	0.04-0.09	Well	1-20	35-90	8	.17	8	Coarse Fragments Throughout - Cal.	7.2-8.4	300
2.0-6.0	0.04-0.10	Well	1-20	35-90	8	.17	B	Coarse Fragments Throughout - Cal.	7.2-8.4	300
0.6-6.0	0.04-0.10	Well	1-9	15-90	8	.24 .17	8	Coarse Fragments Throughout - Cal.	7.4-8.8	375
2.0-6.0	0.04-0.09	Well	3-30	15-60	8	.37	8	Coarse Fragments Throughout		525
2.0-6.0	0.05-0.10	Well	3-10	0-60	8	.17 .10	8	Coarse Fragments Throughout - Cal.	7.4-8.8	300
2.0-6.0	0.04-0.09	Well	3-10	0-60	8	.17	8	Coarse Fragments Throughout - Cal.	7.2-8.4	300
0.6-2.0	0.04-0.08	Well	1-15	15-60	8	.17	8	Coarse Fragments Throughout	7.2-7.8	525
2.0-6.0	0.03-0.09	Well	1-15	15-70	8	.17	8	Coarse Fragments Throughout	7.2	525
0.6-6.0	0.06-0.15	Well	1-30	15-60	8	.15	B	Coarse Fragments Throughout Strongly Cal.		650
0.6-2.0	0.12-0.14	Well	1-5 1-5	0-15	4L	.37	C	6" Gypsum	7.8-8.3	500 0
0.6-2.0	0.16-0.18	Well	3-12	0-15	4L	.49	C	8" Gypsum		800
0.6-2.0	0.10-0.12	Well	3-15	15-65	8	.28	C	Limestone 8edrock 13"		800
0.6-2.0	0.16-0.18	Well	3-5	0-15	4L	.37	B	Calcareous		750
			1-15					Has Inclusions of Strongly Saline Soils-Gypsum		***
			25-100					Gypsum 4"		0
0.6-2.0	0.08-0.10	Well	30-60	15-35	8	.20	D D	Igneous 8edrock 14"		900 0
0.06-0.2	0.10-0.14	Well	30-50	15-35	8	.32	D D	Igneous Bedrock 18"	7.2	1,000 0

TABLE 2-8 (continued)

PHYSICAL PARAMETERS OF SOILS

RANGE SITE	A	B	C			D	E
Soil Mapping Unit and MLRA	Major Mapping Unit Components	% of Unit	Acres Mapped Public	Other	Total	Surface Texture Range & Depths	Subsurface Texture Ranges & Depths
483 Sedillo-Rock Outcrop WP-3	Sedillo	50				0-5" VGRL	5-19" EXGRCL,VGRL 19-60" EXGRSL,VGRLS
	Rock Outcrop	25	296	3,151	3,447		
785 Orthents-Rock Outcrop CP	Orthents	55				Variable	
	Rock Outcrop	35	36,487	15,711	52,198		
786 Rock Outcrop-Badlands CP	Rock Outcrop Badlands	40 40	14,037	7,614	21,651		
Igneous Hills							
689 Rock Outcrop-Orthids SD	Rock Outcrop Orthids	50 30	4,647	2,851	7,498	GRL	Variable
Limestone Hills							
432 Deama-Rock Outcrop WP-2 & 3	Deama	50				0-4" VGRL	4-11" VGRL
	Rock Outcrop	30	4,569 6,279	6,717 3,196	11,286* 9,475**		
482 Rock Outcrop-Deama WP-2	Rock Outcrop Deama	50 30	18,464	7,230	25,694	0-4" VGRL	4-15" GRL
634 Lozier-Rock Outcrop SD	Lozier	45				0-2" VGRSL	2-11" VGRL
	Rock Outcrop	30	29,860	9,317	39,176		
723 Deama-Rock Outcrop CP	Deama	55				0-3" VGRL	3-14" GRL 14-18" VGRCL
	Rock Outcrop	30	361	255	616		
731 Deama-Harvey CP	Deama	45				0-3" STVFSL	3-10" STL
	Harvey	35	4,557	3,237	7,794	0-14" VFSL	14-28" L 28-60" L, SCL
732 Deama-Rock Outcrop CP	Deama	45				0-3" STVFSL	3-10" STL
	Rock Outcrop	35	27,335	8,053	35,388		
781 Rock Outcrop CP	Rock Outcrop		494	373	867		
Loamy							
410 Penistaja WP-2	Penistaja	60	358	690	1,048	0-4" F,VFSL,L	4-23" SCL 23-60" CL
415 Hagerman-Encierro WP-2	Hagerman	45				0-3" FSL	3-24" SCL
	Encierro	35	97	0	97	0-3" COB,GR,FSL	3-12" CL, SC
418 LaFonda-Moenkopie WP-2 & 3	LaFonda	40				0-3" L	3-42" CL, SICL 42-60" SICL, CL
	Moenkopie	25	2,340 1,587	4,226 978	6,567* 2,565**	0-4" L	4-16" L

TA8LE 2-8 (continued)

PHYSICAL PARAMETERS OF SOILS

F Permeability of Most Restrictive Layer	G Available Water Capacity (in./in.)	H Orainage	I Slope %	J % Coarse Fragments (3 in.)	K WEG	L K	M Hydro-logic Group	N Restrictive Layer & Depth	O pH Range	P Pot. Prod. lbs./A
0.2-0.6	0.07-0.11	Well	20-45	35-70	8	.17	B	Coarse Fragments Throughout		700
							0			0
			8-15					Underlain by Shale		***
			15-50				D			0
							D			0
			25-100							0
							D			0
			25-60					Bedrock 40"		***
0.6-2.0	0.10-0.12	Well	5-55	35-60	8	.28	C	Limestone 8edrock 11"		WP-2=650 WP-3=950
							0			0
							D			0
0.6-2.0	0.10-0.12	Well	30-55	35-60	8	.28	C	Limestone 8edrock 15"		650
0.6-2.0	0.05-0.10	Well	15-50	35-60	8	.10	D	Strongly Cal. Limestone 8edrock 11"		475
							0			0
0.6-2.0	0.10-0.12	Well	5-30	15-60	8	.28	C	Limestone 8edrock 18"		700
							D			0
0.6-2.0	0.10-0.12	Well	1-15	15-35	8	.28	C	Limestone 8edrock 10"		700
0.6-2.0	0.11-0.16	Well	1-15	0-15	3	.37	8	Strongly Cal.		750
0.6-2.0	0.10-0.12	Well	30-50	15-35	8	.28	C	Limestone 8edrock 10"	7.8-8.5	700
							0			0
							0			0
0.6-2.0	0.12-0.15	Well	1-5	0-15	3	.24	B	Calcareous		650
0.6-2.0	0.14-0.16	Well	1-15	0-35	3	.32	C	Sandstone Bedrock 24"		700
0.06-0.2	0.10-0.16	Well	1-15	0-35		.28	0	Sandstone Bedrock 12"		700
0.6-2.0	0.15-0.20	Well	2-8	0-15	4L	.43	8	None		750
0.6-2.0	0.16-0.18	Well	8-15	0-15	4L	.43	D	Sandstone 8edrock 16"		550

TABLE 2-8 (continued)

PHYSICAL PARAMETERS OF SOILS

RANGE SITE	A	B	C			D	E
Soil Mapping Unit and MLRA	Major Mapping Unit Components	% of Unit	Acres Mapped Public	Other	Total	Surface Texture Range & Depths	Subsurface Texture Ranges & Depths
419 LaFonda-Moriarty WP-2 & 3	LaFonda	45				0-3" L	3-42" CL, SICL 42-60" SICL
	Moriarty	25				0-3" CL	3-60" CL
	Moriarty, flooded	15					
			12,980	18,703	31,683*		
			11,296	16,070	27,366**		
446 Harvey WP-2 & 3	Harvey	75				0-5" L	5-17" CL
			3,952	5,904	9,856*		17-60" CL
			4,881	975	5,856**		
410 Cerrillos-Penistaja-Clovis WP-3	Cerrillos	30				0-3" FSL	3-20" CL 20-60" SCL
	Penistaja	30				0-3" FSL	3-25" SCL 25-60" FSL
	Clovis	20				0-4" FSL	4-24" SCL
			5,669	1,012	6,681		24-60" FSL
421 Glenberg-Fluvents WP-3	Glenberg	50				0-10" VFSL	10-60" Stratified FSL, L
	Fluvents	40				0-60" Stratified	
			1,202	169	1,371	GRLS, S	
445 Millett-Sedillo WP-3	Millett	40				0-3" GRFSL	3-17" GRCL 17-60" VGRL,VGRFSL
	Sedillo	30				0-3" VGRL	3-19" VGRCL,VGRSCL 19-60" VGRFSL
			6,792	8,719	15,511		
453 Millett WP-3	Millett	85				0-4" L	4-16" CL, GRCL
			10,137	4,849	14,986		16-60" VGRLS
467 Milligan WP-3	Milligan	45				0-8" GRL	8-25" GRL,GRSL
	Milligan	30					25-38" VGRSL
			5,666	2,920	8,585		
710 Cerrillos-Penistaja-Clovis CP	Cerrillos	35				0-3" FSL	3-15" CL 15-60" L
	Penistaja	30				0-6" VFSL	6-38" CL 38-60" L
	Clovis	25				0-7" FSL, VFSL	7-23" SCL
			1,915	3,927	5,842		23-60" L
716 Hagerman-Rizozo CP	Hagerman	40				0-3" VFSL	3-19" CL 19-26" L
	Rizozo	35				0-3" FSL	3-14" L, GRL
			3,990	1,251	5,241		
719 La Fonda CP	La Fonda	85				0-4" L	4-20" L, CL
			5,739	3,534	9,273		20-60" L
735 Rance-Neeto-Gypsum land CP	Rance	55				0-3" VFSL	3-22" SIL, L 22" Gypsum
	Neeto	20				0-12" FSL	12" Gypsum
	Gypsum land	15				Fine Granular Material to Massive	
			7,333	5,253	12,585	Gypsum	
737 Harvey-La Fonda CP	Harvey	40				0-3" SL	3-11" SL, SCL 11-60" VFSL, FSCL
	La Fonda	35				0-3" SL	3-17" L, VFSL
			5,096	6,916	12,012		17-60" L
738 Harvey-Dean CP	Harvey	50				0-4" VFSL	4-18" L 18-60" L, SCL
	Dean	30				0-3" GRVFSL	3-60" GRL
			1,478	491	1,969		
748 Harvey-Ildefonso CP	Harvey	60				0-2" L	2-15" L 15-60" L
	Ildefonso	30				0-3" GRFSL	3-11" GRFSL
			1,673	5,186	6,859		11-60" VGRFSL
625 Anway SO	Anway	85				0-4" FSL	4-16" CL, L
			4,585	889	5,474		16-60" L, CL

TABLE 2-8 (continued)

PHYSICAL PARAMETERS OF SOILS

F Permeability of Most Restrictive Layer	G Available Water Capacity (in./in.)	H Orainage	I Slope %	J % Coarse Fragments (3 in.)	K WEG	L K	M Hydro-logic Group	N Restrictive Layer & Oepth	O pH Range	P Pot. Prod. lbs./A
0.6-2.0	0.15-0.20	Well	0-10	0-15	4L	.43	B	None		750
0.06	0.12-0.14	Well	0-4 0-1	0-15	4	.37	0	None Flooded	7.4-9.2	1,000 2,100
0.6-2.0	0.14-0.18	Well	1-8	0-15	4L	.37	B	Calcareous		WP-2=600 WP-3=750
0.6-2.0	0.13-0.20	Well	1-10	0-15	3	.37	B	Strongly Calcareous 20-60"		750
0.6-2.0	0.13-0.16	Well	1-6	0-15	3	.24	B	Calcareous 25-60"		650
0.6-2.0	0.13-0.20	Well	1-5	0-15	3	.24	B	Strongly Calcareous 24-60"	7.8-9.0	750
2.0-6.0	0.09-0.13	Well	0-5	0-25	3	.24	B	Calcareous		1,600
			0-5	0-35						***
0.6-2.0	0.09-0.14	Well	1-15	15-60			B	Calcareous 17-60"		600
0.2-0.6	0.07-0.15	Well	1-15	15-60	8	.17	B	Calcareous 19-60" Coarse Fragments Throughout		700
0.6-2.0	0.05-0.15	Well	0-5	0-60	5		B	Coarse Fragments Throughout		600
0.6-6.0	0.11-0.13	Well	0-30 0-10	0-60	5		B	Strongly Cal. 25"		625 650
0.6-2.0	0.13-0.20	Well	1-10	0-15	3	.37	B	Calcareous 15-60"		750
0.6-2.0	0.13-0.20	Well	1-9	0-15	3	.24	B	None		1,000
0.6-2.0	0.13-0.20	Well	1-8	0-15	3	.24	B	Calcareous		900
0.6-2.0	0.14-0.16	Well	1-8	0-15	3	.32	C	Sandstone Bedrock 26"		750
2.0-6.0	0.11-0.16	Well	1-15	0-35	3	.32	D	Sandstone Bedrock 14"		650
0.6-2.0	0.15-0.20	Well	1-10	0-15	4L	.43	8	None		700
0.6-2.0	0.13-0.15	Well	1-5	0-15	4L	.49	C	Soft Gypsum 22"		800
2.0-6.0	0.12-0.15	Well	2-15	0-15	3	.37	C	Gypsum 12"		800 0
0.6-2.0	0.11-0.16	Well	8-15	0-15	3	.37	B	Calcareous		750
0.6-2.0	0.15-0.19	Well	3-15	0-15	3	.43	B	None	7.8-8.8	700
0.6-2.0	0.11-0.18	Well	1-9	0-15	3	.37	B	Calcareous 18-60"		750
0.6-2.0	0.11-0.17	Well	1-9	0-35	4L	.32	C	Strongly Calcareous 3-60"	8.2-8.4	600
0.6-2.0	0.16-0.18	Well	1-8	0-15	4L	.37	B	Calcareous 15-60"		750
2.0-6.0	0.06-0.08	Well	1-8	15-60	5	.15	B	Coarse Fragments Throughout - Cal.		800
0.2-0.6	0.11-0.21	Well	1-3	0-15	3	.32 .28	B	None	7.2-8.4	600

TABLE 2-8 (continued)

PHYSICAL PARAMETERS OF SOILS

RANGE SITE	A	B	C			D	E
Soil Mapping Unit and MLRA	Major Mapping Unit Components	% of Unit	Acres Mapped Public	Other	Total	Surface Texture Range & Depths	Subsurface Texture Ranges & Depths
636 Reeves-Halloman SO	Reeves	50				0-4" FSL	4-16" L 16-28" L, CL
	Holloman	30	5,394	3,457	8,851	0-7" VFSL	
641 Turney SO	Turney	85	10,525	1,859	12,384	0-7" L	7-19" SCL, CL 19-60" CL, L
648 Tome SO	Tome	50	3,482	596	4,078	0-4" L	4-60" Stratified SIL, SICL
653 Adelino-Ubar SO	Adelino	45				0-3" FSL	3-22" SCL 22-49" CL 49-60" VFSL
	Ubar	35	4,975	2,790	7,765	0-3" SIL	3-43" SICL, C 43-60" LFS
Malpais							
405 Cabezon-Thunder-bird-Apache WP-2 & 3	Cabezon	35				0-4" STL	4-12" COBCL
	Thunderbird	30				0-4" STCL	4-29" COBC
	Apache	20	10,911 413	15,877 208	26,788* 621**	0-8" COBL	8-13" COBCL
406 Cabezon-Apache-Rock Outcrop WP-2	Cabezon	35				0-3" STL	3-14" GR,COB,STCL
	Apache	30				0-4" STL, COBL	4-16" STL, COBL
	Rock Outcrop	25	23,273	29,198	52,471		
657 Akela-Rock Outcrop SD	Akela	40				0-11" VGRL	
	Rock Outcrop	35					
	Vekol	20	14,748	2,930	17,678	0-2" L	
705 Apache-Cabezon CP	Apache	65				0-3" STL	3-10" GRL 10-17" COBL
	Cabezon	30	2,770	1,163	3,933	0-3" STL	3-15" C
784 Rock Outcrop-Apache CP	Rock Outcrop	40					
	Apache	35	315	61	376	0-3" COBL	3-10" GRL 10-17" COBL
Sandstone Hills							
483 Rock Outcrop-Rizozo WP-2	Rock Outcrop	60					
	Rizozo	20	5,113	5,202	10,315	0-4" STFSL	4-16" GR, STL
Sandy							
422 Otero-Glenberg WP- 2 & 3	Otero	40				0-11" FSL	11-60" FSL
	Glenberg	40	229 50	224 320	453* 370**	0-10" FSL	10-60" Stratified Usually L
455 Penistaja-Palma WP-2 & 3	Penistaja	40				0-11" LFS	11-28" SCL 28-60" SL, SCL
	Palma	30	4,989 1,142	6,735 1,810	11,724* 2,952**	0-10" LFS	10-28" FSL 28-60" FSL,SL,LFS
623 Pajarito-Harrisburg SO	Pajarito	40				0-4" FSL	4-11" FSL 11-60" FSL
	Harrisburg	35	7,684	1,335	9,019	0-4" LFS	4-27" SL, FSL 27" Hard Caliche

TABLE 2-8 (continued)

PHYSICAL PARAMETERS OF SOILS

F Permeability of Most Restrictive Layer	G Available Water Capacity (in./in.)	H Drainage	I Slope %	J % Coarse Fragments (3 in.)	K WEG	L K	M Hydrologic Group	N Restrictive Layer & Depth	O pH Range	P Pot. Prod. lbs./A
0.6-2.0	0.12-0.19	Well	1-5	0-15	4L	.49	C	Gypsum 28"	7.4-8.2	500
0.6-2.0	0.12-0.14	Well	1-8	0-15	4L	.49	C	Gypsum 7"		500
0.6-2.0	0.05-0.17	Well	0-5	0-15	4L	.32	B	None	7.6-9.0	475
0.2-0.6	0.18-0.20	Well	0-3	0-15	4L	.43	C	None		1,500
0.6-2.0	0.13-0.18	Well	1-3	0-15	3	.28	C	None		475
0.06-0.2	0.15-0.20	Well	1-3	0-15	6	.49 .43	C	None		1,800
0.6-2.0	0.13-0.15	Well	3-8	15-35	8	.20	D	Basalt Bedrock 12"		800
0.2-0.6	0.09-0.11	Well	0-3	15-35	8	.32	D	Basalt Bedrock 29"	7.2-8.2	800
0.6-2.0	0.12-0.16	Well	3-10	15-35	8	.28	D	Basalt Bedrock 13"		800
0.6-2.0	0.13-0.15	Well	15-55	15-35	8	.20	D	Basalt Bedrock 14"		800
0.6-2.0	0.12-0.16	Well	15-55	15-35	8	.28	D	Basalt Bedrock 16" Strongly Calcareous 4-16"		800
							D			0
0.6-2.0	0.05-0.10	Well	3-8	15-35	7	.28	D	Bedrock 11"	7.6-8.2	500
							D			0
		Well	0-2			.55	D			1,100
0.6-2.0	0.12-0.16	Well	3-15	15-35	8	.20	D	Basalt Bedrock 17" Strongly Calcareous 3-17"	7.2-8.0	750
0.06-0.6	0.12-0.15	Well	1-10	0-35	8	.20	D	Basalt Bedrock 15"	7.2-7.6	800
							D			0
0.6-2.0	0.12-0.16	Well	8-15	15-35	8	.28	D	Basalt Bedrock 17"		750
							D			0
2.0-6.0	0.11-0.16	Well	55-100	15-35	8	.32	D	Sandstone Bedrock 16"		800
6.0-20	0.09-0.13	Somewhat Excessively	0-5	0-15	3	.10	B	Calcareous Throughout		1,000
2.0-6.0	0.09-0.12	Well	3-9	0-15	3	.24	B	Calcareous		1,600
0.6-2.0	0.09-0.16	Well	1-9	0-15	2	.17	B	None		650
2.0-6.0	0.08-0.14	Somewhat Excessively	1-15	0-15	2	.15	B	None		500
2.0-6.0	0.13-0.15	Well	1-5	0-15	3	.17 .32	B	Strongly Calcareous 11"		500
2.0-6.0	0.10-0.14	Well	1-5	0-15	2	.24	C	Petrocalcic 27"		525

TABLE 2- 8 (continued)

PHYSICAL PARAMETERS OF SOILS

RANGE SITE	A	B	C			0	E
Soil Mapping Unit and MLRA	Major Mapping Unit Components	% of Unit	Acres Mapped Public	Other	Total	Surface Texture Range & Oepths	Subsurface Texture Ranges & Oepths
624 Pajarito-Onite SD	Pajarito	40				0-3" LFS	3-19" SL
							19-60" SL, LFS
	Onite	35				0-3" LFS	3-15" SL
			13,540	4,243	17,783		15-60" SL, LS
627 Oona Ana-Berino SD	Oona Ana	50				0-3" SL	3-21" SL, CL
							21-60" L, SL
	Berino	30				0-4" SL	4-32" SCL
			10,717	1,898	12,615		32-60" L, SCL
629 Berino-Dona Ana	Berino	45				0-4" SL	4-33" SL, SCL
							33-60" SL
	Oona Ana	40				0-3" SL	3-17" SL, SCL
			18,044	7,069	25,113		17-60" L, SL
632 Wink-Harrisburg SD	Wink	50				0-2" FS	2-16" SL
							16-60" SL
	Harrisburg	25				0-11" FS	11-26" FSL
							26" Indurated
			16,198	5,536	21,734		Caliche
635 Wink-Pajarito SD	Wink	50				0-4" LFS	4-26" LFS
							26-60" CL
	Pajarito	35				0-5" LFS	5-24" SL
			21,114	6,073	27,187		24-60" SL
637 Pajarito SO	Pajarito	85				0-3" LFS	3-19" SL
			12,426	1,464	13,890		19-60" SL, LFS
645 Pajarito-Holloman SO	Pajarito	50				0-11" LS	11-60" SL
	Holloman	30				0-6" VFSL	6-18" L of Gypsic Material
							18-40" SL
			7,221	2,842	10,063		40-60" Gysum S
709 Penistaja-Clovis CP	Penistaja	50				0-12" LFS	12-34" SCL
							34-60" FSL
	Clovis	35				0-10" LFS	10-28" SCL
			1,668	438	2,106		28-60" FSL
717 Palma CP	Palma	40				0-3" FSL	3-32" FSL
							32-60" FSL
	Palma	35				0-4" LFS	4-22" FSL
			7,413	3,905	11,318		22-60" SL, L
752 Piro-Pinavetes CP	Piro	45				0-5" S	5-13" LS
							13-60" SL, L
	Pinavetes	35				0-5" S	5-60" S
			7,960	2,678	10,638		
756 Piro CP	Piro					0-4" LS	4-19" SL
			5,164	918	6,082		19-60" L
Shallow							
431 Deama-Harvey WP-2 & 3	Deama	40				0-4" COBL	4-11" COBL
	Harvey	25				0-5" L	5-17" CL
							17-60" L
	Rock Outcrop	15					
			477	1,399	1,876*		
			2,836	2,123	4,959**		
439 Pastura-Oeama WP-3	Pastura	50				0-2" GRL	2-14" GRL
							14" Indurated Caliche
	Oeama	30				0-4" VSTL	4-12" STL
			4,119	630	4,749		

TABLE 2-8 (continued)

PHYSICAL PARAMETERS OF SOILS

F Permeability of Most Restrictive Layer	G Available Water Capacity (in./in.)	H Drainage	I Slope %	J % Coarse Fragments (3 in.)	K WEG	L K	M Hydrologic Group	N Restrictive Layer & Depth	O pH Range	P Pot. Prod. lbs./A
2.0-6.0	0.09-0.15	Well	1-5	0-15	2	.17	B	None		500
2.0-6.0	0.06-0.15	Well	1-8	0-15	2	.17	B	None	7.2-8.4	450
0.6-2.0	0.08-0.17	Well	1-5	0-15	3	.24	B	None		350
0.6-2.0	0.10-0.17	Well	1-5	0-15	3	.24	B	None	7.0-8.4	350
0.6-2.0	0.10-0.17	Well	1-5	0-15	3	.24	B	None	7.2-8.8	350
0.6-2.0	0.08-0.17	Well	1-5	0-15	3	.24	B	None		350
2.0-6.0	0.10-0.14	Well	1-5	0-15	1	.20	B	Calcareous		700
2.0-6.0	0.10-0.14	Well	3-8	0-15	1	.24	C	Petrocalcic 26"		525
2.0-6.0	0.10-0.15	Well	1-3	0-15	2	.17	B	Calcareous		700
2.0-6.0	0.08-0.15	Well	1-8	0-15	2	.20	B	None		500
2.0-6.0	0.09-0.15	Well	1-5	0-15	2	.17	B	None		500
2.0-6.0	0.09-0.15	Well	1-3	0-15	2	.17	B	None		500
0.6-2.0	0.12-0.14	Well	1-3	0-15	4L	.49	C	Gypsiferous Material 6-60"		500
0.6-2.0	0.09-0.16	Well	0-8	0-15	2	.17	B	None	7.2	650
0.6-2.0	0.13-0.20	Well	0-8	0-15	2	.24	B	Strongly Calcareous 28-60"		700
2.0-6.0	0.12-0.14	Well to Somewhat	1-8	0-15	3	.24	B	None	7.2-8.8	1,000
2.0-6.0	0.08-0.14	Excessively	1-8	0-15	2	.15	B	None	7.2-8.8	1,000
0.6-2.0	0.06-0.09	Well	1-5	0-15	1	.15	B	None		800
6.0-20.0	0.05-0.08	Somewhat Excessively	1-5	0-15	1	.20	A	None	7.2	850
0.6-2.0	0.06-0.09	Well	1-5	0-15	2	.15	B	None	7.2-8.6	800
0.6-2.0	0.10-0.12	Well	8-30	15-35	8	.28	C	Limestone Bedrock 11" Strongly Calcareous		WP-2=650 WP-3=950
0.6-2.0	0.14-0.18	Well	3-8	0-15	4L	.37	B	Calcareous		WP-2=600 WP-3=750
							0			0
0.6-2.0	0.10-0.13	Well	1-8	15-35	4L	.32	0	Petrocalcic 14"	7.6-8.8	950
0.6-2.0	0.10-0.12	Well	5-15	15-60	8	.28	C	Limestone Bedrock 12"		950

TABLE 2-8 (continued)

PHYSICAL PARAMETERS OF SOILS

RANGE SITE	A	B	C			D	E
Soil Mapping Unit and MLRA	Major Mapping Unit Components	% of Unit	Acres Mapped Public	Other	Total	Surface Texture Range & Depths	Subsurface Texture Ranges & Depths
459 Pastura Variant WP-3	Pastura Var.	75	3,160	634	3,794	0-3" GRL	3-17" GRL 17" Indurated Caliche
484 Persayo-Rock Outcrop WP-3	Persayo Rock Outcrop	50 25	7,334	3,089	10,424	0-3" L	3-9" CL 9-17" L
490 Penasco WP-3	Penasco	55 30	1,965	133	2,098	0-2" VGRL	2-12" GRL 12" Indurated Caliche
783 Rock Outcrop-Rizozo CP	Rock Outcrop Rizozo	50 30	13,836	7,615	21,451	0-3" CHSIL	3-14" CHSIL
Shallow Sandstone							
434 Moenkopie-Rock Outcrop WP-2	Moenkopie Rock Outcrop	50 30	6,683	9,749	16,432	0-16" SL	
Shallow Sandy							
656 Aftaden-Rock Outcrop SO	Aftaden Rock Outcrop	45 30	825	50	875	0-3" LS	3-13" FSL
No Range Site							
485 Rock Outcrop-Orthents	Rock Outcrop Orthents	35 30	9,270	12,006	21,276	Variable	
491 Riverwash	Riverwash		9,360	10,868	20,228	Unconsolidated Recent Alluvium	
660 Ouneland SO	Ouneland	100	120	406	526	FS, LFS	
687 Gypsum SO	Gypsum		407	161	568		
800 Rock Outcrop-Boralfs RM	Rock Outcrop Boralfs	60 20	2,308	646	2,954		

* Acreage Figures for WP-2
** Acreage Figures for WP-3
***These Soils are too Variable to Interpret.

Source: BLM Socorro District and SCS Files

TABLE 2-8 (continued)

PHYSICAL PARAMETERS OF SOILS

F Permeability of Most Restrictive Layer	G Available Water Capacity (in./in.)	H Drainage	I Slope %	J % Coarse Fragments (3 in.)	K WEG	L K	M Hydro-logic Group	N Restrictive Layer & Depth	O pH Range	P Pot. Prod. lbs./A
0.6-2.0	0.10-0.13	Well	3-8	15-35	4L	.32	0	Petrocalcic 17"		950
0.2-0.6	0.15-0.19	Well	5-30	0-15	4L	.37	0	Weathered Shale 17"		500
							D			0
0.6-2.0	0.13-0.15	Well	5-15 10-20	15-60	8	.24	0	Petrocalcic 12"	7.2-8.8	950
							0			0
2.0-6.0	0.11-0.16	Well	15-30	10-35	7	.32	0	Sandstone 14"	7.8	800
2.0-6.0	0.11-0.13	Well	3-55	0-15	3	.37	0	Sandstone Bedrock 16"		450
							D			0
2.0-6.0	0.06-0.13	Well	1-8	0-15	2	.17	0	Basalt Bedrock 13"	7.2-8.2	500
							0			0
			30-55				0			0
			15-30		8			Coarse Fragments		***
										***
		Excessively	10-100	0-1			A	None		0
										***
							0			0
			30-60							***

KEY FOR TABLE 2-8

A = Major components of soil mapping units.

B = Percent of the mapping unit which each component series occupies. The series totals for each mapping unit will vary depending upon the amount of inclusions (which are not listed).

C = Number of acres for each mapping unit in the ES Area.

D = Surface texture abbreviations are as follows:

- C = Clay
- CH = Channery
- COB = Cobbly
- EX = Extremely
- F = Fine
- GR = Gravelly
- L = Loam (y)
- S = Sand (y)
- SI = Silt (y)
- ST = Stony
- V = Very

E = Subsoil and substratum texture abbreviations are the same as above.

F = Soil permeability is expressed as the estimated inches/hour through saturated undisturbed cores under 1/2-inch of water. The following are the permeability classes:

	in./hr.	Class
less than	0.06	Very Slow
	0.06-0.2	Slow
	0.2 -0.6	Moderately Slow
	0.6 -2.0	Moderate
	2.0 -6.0	Moderately rapid
	6.0 -20.0	Rapid
more than	20.0	Very Rapid

G = The available water capacity is the ability of soil to hold water for use by most plants. It is the difference between the amount of soil water at field capacity and the amount at wilting point.

H = Soil drainage classes, as defined in the U.S.D.A. Agriculture Handbook 18, are as follows:

Moderately Well - Water is removed from the soil somewhat slowly so the profile is wet for a small but significant part of the time.

Well - Water is removed from the soil readily but not rapidly. Well drained soils commonly retain optimum amounts of moisture for plant growth after rains or additions of irrigation water.

Somewhat excessively - Water is removed from the soil rapidly. Only a narrow range of crops can be grown on these soils, and the yields are usually low without irrigation.

Excessively - Water is removed from the soil very rapidly. Enough precipitation is commonly lost from these soils to make them unsuitable for ordinary crop production.

I = Slope range for each soil series in the mapping unit.

J = This column includes only coarse fragments greater than 3 inches (i.e., gravels, cobbles, and stones).

K = Wind erodibility groups are listed in Appendix 3.

L = K is the soil erodibility factor which is used in the universal soil loss equation. It is a function of soil texture, organic matter content, and structure.

M = All the soils are placed in a hydrologic Group A through D. Soils in Group A have the lowest runoff potential and those in Group D have the highest runoff potential. These classes are defined in the glossary.

N = Restrictive layers include bedrock, petrocalcic horizons, gypsum, horizons with a high percentage of coarse fragments, and strongly calcareous or saline horizons within 40 inches of the surface.

O = pH range for each soil (this data was not available for all soils).

P = Potential productivity for a normal year tailored to the local area (from SCS Form 5).

The following soil mapping units were mapped in Valencia County: 484-Basalt Rock Outcrop-Orthents, 420-Moriarty, 421-Glenberg-Fluvents (WP-2 and WP-3), 410-Penistaja, 415-Hagerman-Encierro, 406-Cabezon-Apache-Rock Outcrop, 483-Rock Outcrop-Rizozo, 422-Otero-Glenberg, 455-Penistaja-Palma, and 476-Gypsiorthids.

TABLE 2-9
SEDIMENT YIELD BY RANGE SITE

	EE					PA					NA/FE*					LA					PCL/ESR					NG**				
											AMP Allotments		Non-AMP Allotments		All Allotments															
Range Site & MLRA	Total PSIAC Rating	Sediment Yield Class	Sediment Yield (ac-ft/sq mi/yr)	Sq mi	Total Annual Sediment Yield (ac-ft)	Total PSIAC Rating	Sediment Yield Class	Sediment Yield (ac-ft/sq mi/yr)	Sq mi	Total Annual Sediment Yield (ac-ft)	Sediment Yield (ac-ft/sq mi/yr)	Sq mi	Sediment Yield (ac-ft/sq mi/yr)	Sq mi	Total Annual Sediment Yield (ac-ft)	Total PSIAC Rating	Sediment Yield Class	Sediment Yield (ac-ft/sq mi/yr)	Sq mi	Total Annual Sediment Yield (ac-ft)	Total PSIAC Rating	Sediment Yield Class	Sediment Yield (ac-ft/sq mi/yr)	Sq mi	Total Annual Sediment Yield (ac-ft)	Total PSIAC Rating	Sediment Yield Class	Sediment Yield (ac-ft/sq mi/yr)	Sq mi	Total Annual Sediment Yield (ac-ft)
Basalt Hills																														
WP-2	-	-	-	8.4	-	-	-	-	8.4	-	-	2.6	-	5.8	-	-	-	-	8.4	-	-	-	-	8.4	-	-	-	-	3.9	-
WP-3	53	3	.55	8.2	4.51	47	4	.44	8.2	3.61	.44	0.0	.55	8.2	4.51	48	4	.45	8.2	3.69	46	4	.42	8.2	3.44	37	4	.30	5.5	1.65
Bottomland																														
WP-2	77	2	1.30	10.0	13.00	65	3	.85	10.0	8.50	.85	4.9	1.30	5.1	10.80	69	3	.98	10.0	9.80	65	3	.85	10.0	8.50	56	3	.60	4.5	2.70
WP-3	81	2	1.50	2.1	3.15	72	2	1.15	2.1	2.42	1.15	1.4	1.50	0.7	2.66	74	2	1.20	2.1	2.52	71	2	1.08	2.1	2.27	62	3	.75	0.4	0.30
SO	46	4	.42	32.5	13.65	38	4	.31	32.5	10.08	.31	10.8	.42	21.7	12.46	40	4	.34	32.5	11.05	37	4	.30	32.5	9.75	29	4	.21	22.5	4.73
CP	72	2	1.15	21.6	24.84	61	3	.73	21.6	15.77	.73	0.0	1.15	21.6	24.84	65	3	.85	21.6	18.36	60	3	.70	21.6	15.12	52	3	.53	6.9	3.66
Deep Sand																														
SO	41	4	.35	53.7	18.80	33	4	.26	53.7	13.96	.26	8.5	.35	45.2	18.03	35	4	.28	53.7	15.04	32	4	.25	53.7	13.43	23	5	.18	36.3	6.53
Gravelly																														
WP-3	47	4	.44	75.3	33.13	38	4	.31	75.3	23.34	.31	33.3	.44	42.0	28.80	40	4	.34	75.3	25.60	36	4	.29	75.3	21.84	27	4	.20	49.9	9.98
SO	45	4	.40	254.5	101.80	38	4	.31	254.5	78.90	.31	123.9	.40	130.6	90.65	39	4	.33	254.5	83.99	36	4	.29	254.5	73.81	27	4	.20	199.5	39.90
CP	44	4	.38	10.0	3.80	36	4	.29	10.0	2.90	.29	7.8	.38	2.2	3.10	38	4	.31	10.0	3.10	34	4	.27	10.0	2.70	25	5	.19	6.5	1.24
Gypsum																														
SO	60	3	.70	14.4	10.08	52	3	.53	14.4	7.63	.53	0.0	.70	14.4	10.08	54	3	.56	14.4	8.06	51	3	.52	14.4	7.49	41	4	.35	10.3	3.61
CP	60	3	.70	61.2	42.84	51	3	.52	61.2	31.82	.52	5.6	.70	55.6	41.83	54	3	.56	61.2	34.27	50	3	.50	61.2	30.60	42	4	.36	28.3	10.19
Gypsum Flats																														
WP-2	-	-	-	0.5	-	-	-	-	0.5	-	-	0.5	-	0.0	-	-	-	-	0.5	-	-	-	-	0.5	-	-	-	-	0.2	-
Gypsum Hills																														
CP	89	2	2.05	28.5	58.43	81	2	1.50	28.5	42.75	1.50	8.5	2.05	20.0	53.75	83	2	1.60	28.5	45.60	80	2	1.45	28.5	41.33	70	2	1.00	20.2	20.20
Hills																														
WP-3	63	3	.79	85.6	67.62	54	3	.56	85.6	47.94	.56	5.2	.79	80.4	66.43	56	3	.60	85.6	51.36	53	3	.55	85.6	47.08	44	4	.38	58.7	22.31
CP	99	2	2.90	115.4	334.66	93	2	2.30	115.4	265.42	2.30	36.9	2.90	78.5	312.52	94	2	2.40	115.4	276.96	90	2	2.10	115.4	242.34	89	2	2.05	78.9	161.75
Igneous Hills																														
SO	-	-	-	11.7	-	-	-	-	11.7	-	-	4.7	-	7.0	-	-	-	-	11.7	-	-	-	-	11.7	-	-	-	-	7.3	-
Limestone Hills																														
WP-2	56	3	.60	57.8	34.68	49	4	.48	57.8	27.74	.48	15.9	.60	41.9	32.77	50	3	.50	57.8	28.90	47	4	.44	57.8	25.43	38	4	.31	36.0	11.16
WP-3	51	3	.52	15.1	7.85	44	4	.38	15.1	5.74	.45	0.0	.52	15.1	7.85	45	4	.40	15.1	6.04	41	4	.35	15.1	5.29	33	4	.26	9.8	2.55
SO	48	4	.45	61.2	27.54	40	4	.34	61.2	20.81	.34	16.6	.45	44.6	25.71	42	4	.36	61.2	22.03	38	4	.31	61.2	18.97	29	4	.21	46.7	9.81
CP	53	3	.55	69.8	38.39	45	4	.40	69.8	27.92	.40	16.0	.55	53.8	35.99	45	4	.40	69.8	27.92	43	4	.37	69.8	25.83	35	4	.28	51.2	14.34
Loamy																														
WP-2	70	2	1.00	77.0	77.00	62	3	.75	77.0	57.75	.75	38.0	1.00	39.0	67.50	63	3	.79	77.0	60.83	60	3	.70	77.0	53.90	53	3	.55	30.8	16.94
WP-3	61	3	.73	129.6	94.61	51	3	.52	129.6	67.39	.52	13.7	.73	115.9	91.73	55	3	.58	129.6	75.17	50	3	.50	129.6	64.80	41	4	.35	73.8	25.83
SD	55	3	.58	60.2	34.92	46	4	.42	60.2	25.28	.42	21.3	.58	38.9	31.51	48	4	.45	60.2	27.09	45	4	.40	60.2	24.08	36	4	.29	45.3	13.14
CP	55	3	.58	84.0	48.72	47	4	.44	84.0	36.96	.44	9.6	.58	74.4	47.37	48	4	.45	84.0	37.80	45	4	.40	84.0	33.60	37	4	.30	42.5	12.75
Malpais																														
WP-2	59	3	.68	123.8	84.20	49	4	.48	123.8	59.42	.48	60.2	.68	63.6	72.15	52	3	.53	123.8	65.61	47	4	.44	123.8	54.47	40	4	.34	53.4	18.18
WP-3	48	4	.45	1.0	0.45	41	4	.35	1.0	0.35	.35	0.0	.45	1.0	.45	42	4	.36	1.0	0.36	39	4	.33	1.0	0.33	30	4	.22	0.6	0.13
SD	36	4	.29	27.6	8.00	29	4	.21	27.6	5.80	.21	0.0	.29	27.6	8.00	30	4	.22	27.6	6.07	27	4	.20	27.6	5.52	17	5	.14	23.0	3.22
CP	58	3	.65	6.7	4.36	52	3	.53	6.7	3.55	.53	0.0	.65	6.7	4.36	53	3	.55	6.7	3.69	50	3	.50	6.7	3.35	41	4	.35	4.8	1.68
Sandstone Hills																														
WP-2	56	3	.60	16.1	9.66	48	4	.45	16.1	7.25	.45	5.2	.60	10.9	8.88	50	3	.50	16.1	8.05	46	4	.42	16.1	6.76	38	4	.31	8.0	2.48

TABLE 2-9 (Cont.)
SEDIMENT YIELD BY RANGE SITE
PAGE 2 of 2

Range Site & MLRA	EE Total PSIAC Rating	EE Sediment Yield Class	EE Sediment Yield (ac-ft/sq mi/yr)	EE Sq mi	EE Total Annual Sediment Yield (ac-ft)	PA Total PSIAC Rating	PA Sediment Yield Class	PA Sediment Yield (ac-ft/sq mi/yr)	PA Sq mi	PA Total Annual Sediment Yield (ac-ft)	NA/FE* AMP Allotments Sediment Yield (ac-ft/sq mi/yr)	NA/FE* AMP Allotments Sq mi	NA/FE* Non-AMP Allotments Sediment Yield (ac-ft/sq mi/yr)	NA/FE* Non-AMP Allotments Sq mi	NA/FE* All Allotments Total Annual Sediment Yield (ac-ft)	LA Total PSIAC Rating	LA Sediment Yield Class	LA Sediment Yield (ac-ft/sq mi/yr)	LA Sq mi	LA Total Annual Sediment Yield (ac-ft)	PCL/ESR Total PSIAC Rating	PCL/ESR Sediment Yield Class	PCL/ESR Sediment Yield (ac-ft/sq mi/yr)	PCL/ESR Sq mi	PCL/ESR Total Annual Sediment Yield (ac-ft)	NG** Total PSIAC Rating	NG** Sediment Yield Class	NG** Sediment Yield (ac-ft/sq mi/yr)	NG** Sq mi	NG** Total Annual Sediment Yield (ac-ft)
Sandy																														
WP-2	52	3	.53	19.0	10.07	44	4	.38	19.0	7.22	.38	11.7	.53	7.3	8.32	46	4	.42	19.0	7.98	43	4	.37	19.0	7.03	33	4	.26	8.2	2.13
WP-3	53	3	.55	6.8	3.74	45	4	.40	6.8	2.72	.40	1.6	.55	5.2	3.50	47	4	.44	6.8	2.99	44	4	.38	6.8	2.58	35	4	.28	1.9	0.53
SD	40	4	.34	214.7	73.00	31	4	.24	214.7	51.53	.24	47.9	.34	166.8	68.21	34	4	.27	214.7	57.97	30	4	.22	214.7	47.23	22	5	.17	167.1	28.41
CP	43	4	.37	47.1	17.43	33	4	.26	47.1	12.25	.26	0.0	.37	47.1	17.43	36	4	.29	47.1	13.66	32	4	.25	47.1	11.78	23	5	.18	34.7	6.25
Shallow																														
WP-2	55	3	.58	2.9	1.68	47	4	.44	2.9	1.28	.44	0.0	.58	2.9	1.68	49	4	.48	2.9	1.39	45	4	.40	2.9	1.16	36	4	.29	0.7	0.20
WP-3	54	3	.56	40.7	22.79	46	4	.42	40.7	17.09	.42	11.1	.56	29.6	21.24	47	4	.44	40.7	17.91	44	4	.38	40.7	15.47	36	4	.29	30.3	8.79
CP	53	3	.55	33.5	18.43	45	4	.40	33.5	13.40	.40	0.0	.55	33.5	18.43	47	4	.44	33.5	14.74	43	4	.37	33.5	12.40	36	4	.29	21.6	6.26
Shallow Sandstone																														
WP-2	61	3	.73	25.7	18.76	54	3	.56	25.7	14.39	.56	9.1	.73	16.6	17.22	55	3	.58	25.7	14.91	52	3	.53	25.7	13.62	43	4	.37	10.4	3.85
Shallow Sandy																														
SD	40	4	.34	1.4	0.48	32	4	.25	1.4	0.35	.25	0.0	.34	1.4	0.48	34	4	.27	1.4	0.38	31	4	.24	1.4	0.34	21	5	.16	1.3	0.21

	EE Yield	EE Sq mi	EE Total	PA Yield	PA Sq mi	PA Total	NA/FE AMP Sq mi	NA/FE Non-AMP Sq mi	NA/FE All Total	LA Yield	LA Sq mi	LA Total	PCL/ESR Yield	PCL/ESR Sq mi	PCL/ESR Total	NG Yield	NG Sq mi	NG Total
Total		1,915.3	1,367.07		1,915.3	1,021.23	532.5	1,382.8	1,271.24		1,915.3	1,090.89		1,915.3	953.64		1,241.9	477.57
Range sites without sediment yield values		20.6			20.6		7.8	12.8			20.6			20.6			11.4	
Range sites with sediment yield values		1,894.7			1,894.7		524.7	1,370.0			1,894.7			1,894.7			1,230.5	
Mean sediment yield	.72			.54			(Mean sediment yield for AMP and non-AMP allotments = .67 ac-ft/sq mi/yr)			.58			.50			.39		
Mean sediment yield x total ES area (2,059.6 sq mi) = total sediment yield for the E5 area			1,482.91			1,112.18			1,379.93									

144.3 sq mi could not be placed in a range site.

Sediment Yield Classes

2 - critical - 1.0 - 3.0 ac-ft/sq mi/yr
3 - moderate - 0.5 - 1.0 ac-ft/sq mi/yr
4 - slight - 0.2 - 0.5 ac-ft/sq mi/yr
5 - stable - less than 0.2 ac-ft/sq mi/yr

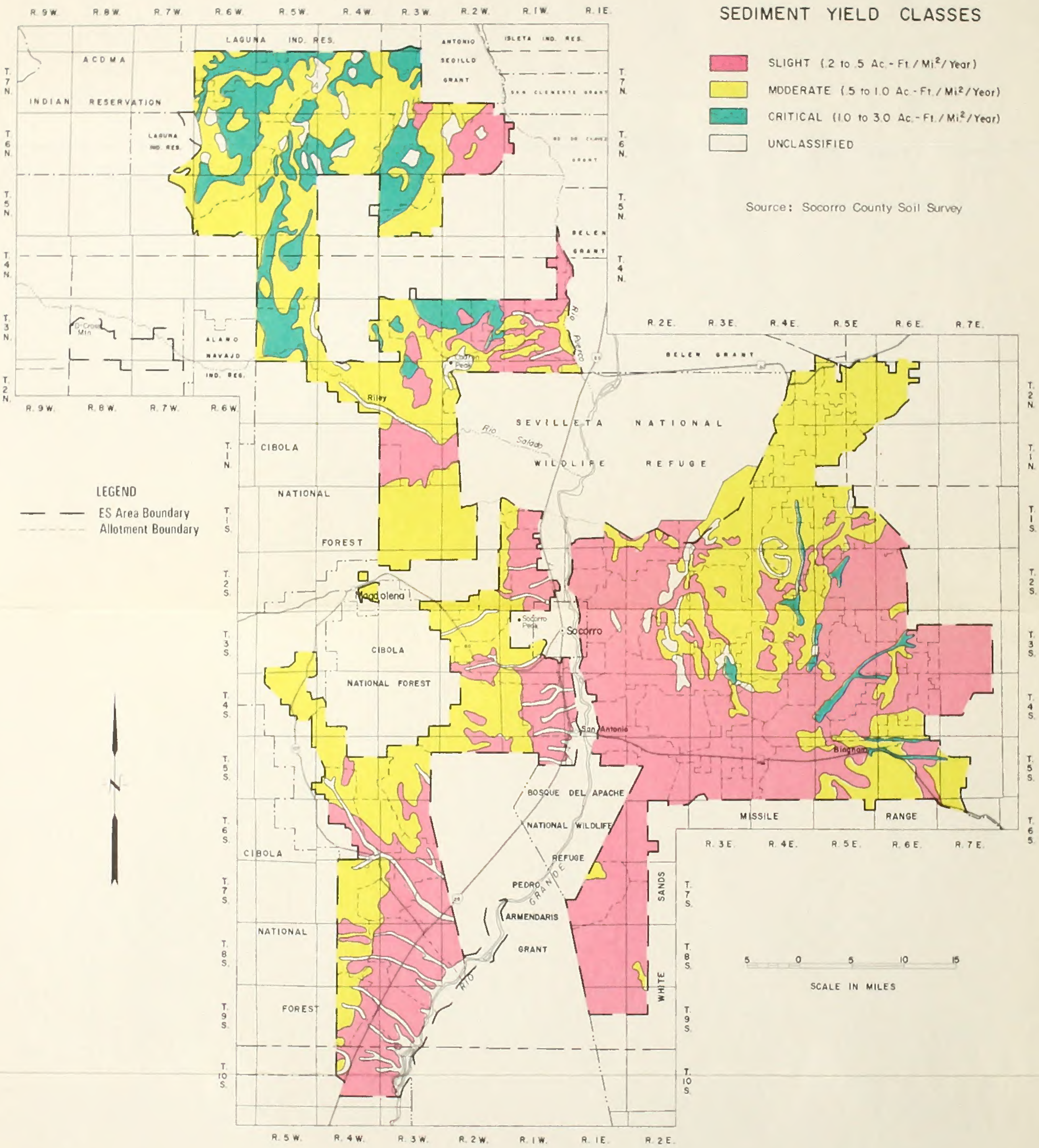
PSIAC Rating is explained in Appendix 3

*Sediment yield classes and total PSIAC rating for AMP allotments are the same as PA; for non-AMP and remaining allotments they are the same as the EE.

**The NG Alternative applies to public lands only.

Source: Socorro County Soil Survey and PSIAC Method

EE - Existing Environment
NA/FE - No Action Alternative and Future Environment
PA - Proposed Action
LA - Livestock Adjustment Alternative
PCL - Pasture Capacity Level Alternative
ESR - Enhancement of Sensitive Resource Values Alternative
NG - No Grazing Alternative



MAP 2-4. Sediment Yield Classes

square mile per year), critical (1.0 to 3.0 acre-feet per square mile per year), moderate (0.5 to 1.0 acre-feet per square mile per year), slight (0.2 to 0.5 acre-feet per square mile per year), and stable (less than 0.2 acre-feet per square mile per year). For a discussion of PSIAC Methodology see Appendix 3, p. A-73.

Present annual sediment yield is estimated to be about 1,410 to 1,555 acre-feet. Sediment yields are presented by range site in Table 2-9. Soils in the malpais-SD, sandy-SD, shallow sandy-SD, and deep sand-SD range sites have the lowest sediment yields. The range in sediment yield of these soils is from 0.2 to 0.5 acre-feet per square mile per year (slight class). Soils in the hills-CP and gypsum hills-CP range sites have the highest sediment yields; they range from 1.0 to 3.0 acre-feet per square mile per year (critical class). Table 2-9 presents sediment yields for all the range sites. Table 2-10 presents the sediment yield classes. Sediment yield classes in the ES Area range from 12.4 percent in the critical class, to 41.8 percent in the moderate class, to 37.8 percent in the slight class; 8.0 percent could not be put in a class. None of the range site soil groupings are presently in the severe or stable classes. Individual soils may be in a different sediment yield class than the range site soil group they are placed in because these groups are only the average of all the soils. See Map 2-4 for present sediment yield classes.

WIND EROSION

Wind erosion can only be discussed as the susceptibility to soil blowing as described by the wind erodibility group (WEG). WEGs establish a range of 'I' values (soil erodibility index) which are used in the 'Wind Erosion Equation,' E = f(IKCLV), to predict soil loss in tons per acre per year (SCS, 1975).

The properties which most influence the soil's susceptibility to blowing are the texture of the surface inch, presence of carbonates, percent coarse fragments, and moisture content of the soil. The groups range from 1 (very high soil blowing hazard) to 8 (slight soil blowing hazard). Appendix 3, p. A-72 discusses how the soils are placed in various WEGs. Column K of Table 2-8 displays WEGs for the soils in the ES Area.

Soils in the deep sand and sandy range sites are most susceptible to wind erosion hazard. Soils in the basalt hills, gravelly hills, limestone hills, and malpais range sites are least susceptible to wind erosion.

Future Environment

Developments which require excavation would disturb soil on 31 acres in the short term and 19 acres in the long term. Developments which do not require excavation would disturb 60 acres in the short term and 48 acres in the long term. Infiltration and water retention would decrease on these disturbed areas.

Total sediment yield in the Future Environment would be reduced approximately 7 percent from existing levels of 1,410 to 1,555 acre-feet per year to 1,310 to 1,450 acre-feet per year. Soils on the 25 existing AMP allotments would have an average annual sediment yield of .54 acre- feet per square mile per year. On non-AMP allotments the average annual sediment yield would remain at .72 acre-feet per square mile per year.

Impacts

SOIL DISTURBANCES

Areas exposed during construction of range developments would be subjected to a local increase in soil erosion by wind and water. Removal of vegetation exposes the soil directly to the impact of falling rain which destroys the soil aggregates. As a result, the soil structure deteriorates and makes the soil more conducive to erosion.

Developments which do not require excavation, such as troughs, wildlife waters, and fences, would affect small areas during construction. These developments would disturb the soil mostly by compaction. Developments which require excavation, such as pipelines, cattleguards, springs, wells, storage tanks, and earthen reservoirs, would disturb the soil more than the other developments. Vegetation and topsoil would be moved and compacted by this type of construction. Concentrations of livestock around new troughs would create new sacrifice areas and cause increased surface disturbance, because vegetation is depleted and soil is compacted. The acreages disturbed for the Proposed Action and each alternative are shown in Table 1-4.

Proposed Action - Developments which require excavation would disturb 164 acres in the short term and 96 acres in the long term. Developments which do not require excavation would disturb 417 acres in the short term and 243 acres in the long term.

No Action Alternative - Developments which require excavation would disturb soil on 31 acres in the short term and 19 acres in the long term. Developments which do not require excavation would disturb 60 acres in the short term and 48 acres in the long term.

Livestock Adjustment Alternative - Developments which require excavation would disturb soil on 31 acres in the short term and 19 acres in the long term. Developments which do not require

TABLE 2-10

COMPARISON OF SEDIMENT YIELD CLASSES

	EE	PA	NA/FE	LA	PCL/ESR	NG*
% of ES Area by Range Site in Stable Class 0-.2 ac.-ft./mi.sq./yr.	0	0	0	0	0	13.1
% of ES Area by Range Site in Slight Class .2-.5 ac.-ft./mi.sq./yr.	37.8	63.9	38.8	54.3	63.9	39.8
% of ES Area by Range Site in Moderate Class .5- 1.0 ac.-ft./mi.sq./yr.	41.8	21.0	44.6	30.6	21.0	2.1
% of ES Area by Range Site in Critical Class 1.0-3.0 ac.-ft./mi.sq./yr.	12.4	7.1	8.6	7.1	7.1	4.8
Unclassified	8.0	8.0	8.0	8.0	8.0	40.2
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

EE - EXISTING ENVIRONMENT
NA/FE - NO ACTION ALTERNATIVE AND FUTURE ENVIRONMENT
PA - PROPOSED ACTION
LA - LIVESTOCK ADJUSTMENT ALTERNATIVE
PCL - PASTURE CAPACITY LEVEL ALTERNATIVE
ESR - ENHANCEMENT OF SENSITIVE RESOURCE VALUES ALTERNATIVE
NG - NO GRAZING ALTERNATIVE

* Only public land is considered, so a large portion of the ES Area would be unclassified.

Source: Table 2-9

excavation would disturb 60 acres in the short term and 48 acres in the long term.

Pasture Capacity Level Alternative - Developments which require excavation would disturb soil on 164 acres in the short term and 96 acres in the long term. Developments which do not require excavation would disturb 417 acres in the short term and 243 acres in the long term.

Enhancement of Sensitive Resource Values Alternative - Developments which require excavation would disturb soil on 164 acres in the short term and 96 acres in the long term. Developments which do not require excavation would disturb 443 acres in the short term and 248 acres in the long term.

No Grazing Alternative - A total of 1,475 acres in the short term and 295 acres in the long term would be disturbed by the construction of 1,475 miles of fences.

INFILTRATION AND WATER RETENTION

Construction of range developments would result in decreased infiltration and water retention in affected soils. There would be a greater disturbance of soils in the loamy and bottomland range sites, because they compact more readily. Construction of developments would decrease water retention and infiltration because of soil compaction and disturbance or removal of vegetation and roots. As a result, less water would be intercepted, and more would run off the soil surface. New sacrifice areas around new water developments would be created. In these areas trampling and heavy utilization would cause a decrease in infiltration and water retention. Overall decreases in infiltration and water retention would be local, small, and unmeasurable.

Through improved livestock management and reduced utilization, vegetative density and cover would increase. This would increase the soil's infiltration and water retention. Increased cover would decrease the sealing of the soil due to raindrop impact and would increase infiltration. More precipitation would be intercepted because of the increased vegetative cover. Increased root density would improve available water holding capacity by increasing infiltration. Table 2-14 in the Water Resources Section presents infiltration rates for the Proposed Action and alternatives. Data is not available to quantify the increases in water retention. Qualitative change is directly related to percent change in density and cover. Table A-20 (Appendix 3, p. A-75) displays changes in cover by range sites. This is a long-term, area-wide impact.

Proposed Action - Construction would decrease infiltration and water retention on 580 acres in the short term and 339 acres in the long term.

Vegetative density and cover would increase 2.7 percent overall, in the long term; this would increase infiltration and water retention. Range sites with the greatest increases in cover would have the greatest increases in infiltration and water retention. Loamy WP-2 and CP, sandy CP, malpais WP-2, and bottomland WP-2 and CP would have the greatest increases in cover, 7 to 10 percent (Appendix 3, Table A-20, p. A-75).

No Action Alternative - Construction would decrease infiltration and water retention on 90 acres in the short term and 67 acres in the long term.

Increases in vegetative cover and density would not be as much as for the Proposed Action. Only the 25 existing AMP allotments would have increases in density and cover with an average increase of 2.7 percent from the existing 34.1 percent to 36.8 percent. On AMP allotments density and cover would increase on 24 range sites. Infiltration and water retention would increase as the density and cover increases. On non-AMP allotments there would not be any increase in vegetative density and cover; and, therefore, no increase in infiltration or water retention because grazing systems would not be implemented and utilization would not be reduced on these allotments.

Livestock Adjustment Alternative - Construction would decrease infiltration and water retention on 90 acres in the short term and 67 acres in the long term. Through improved livestock management and decreased utilization, vegetative density and cover would increase. Fifteen of the 38 range sites would show no increase in cover and would not be expected to increase their water retention. Twenty-three (23) of the range sites would show increases in cover; but in most cases, it would only be 1 to 3 percent (Appendix 3, Table A-20, p. A-75). Soils in these range sites would be expected to increase their water retention slightly.

Pasture Capacity Level Alternative - Construction would decrease infiltration and water retention on 580 acres in the short term and 339 acres in the long term. Increases in cover range from 1 to 12 percent and average 5.8 percent. Cover would increase on all range sites with this alternative, so infiltration and water retention would increase on these soils more than with the Proposed Action.

Enhancement of Sensitive Resource Values Alternative - Construction would decrease infiltration and water retention on 607 acres in the short term and 344 acres in the long term. For the total area infiltration and water retention would increase because increases in cover would be the same (ranging from 1 to 12 percent and averaging 5.8

percent) as for the Pasture Capacity Level Alternative (Appendix 3, Table A-20, p. A-75).

No Grazing Alternative - Construction of 1,475 miles of fences would decrease infiltration and water retention on 1,475 acres in the short term and 295 acres in the long term.

The elimination of grazing on public land would increase vegetative density and cover by 1 to 9 percent (average 4.4 percent). All the range sites would have increases in vegetative density and cover on public land. On private and State lands vegetative density and cover are not expected to change, so infiltration and water retention would not change.

WATER EROSION

The construction of range developments and access roads would increase soil erosion in affected areas. Increases in surface runoff would occur where vegetation is removed and the soil surface is disturbed. This would produce conditions conducive to sheet and rill erosion. Where slopes are unstable, gully formation would also increase. Developments which require excavation (pipelines, cattleguards, springs, wells, and earthen reservoirs) would disturb the soil more than those which do not, because vegetation and topsoil would be moved and compacted. Also, in areas of critically eroded soils, erosion may increase greatly. These areas are scattered throughout a larger area so the long-term, area-wide impact would be small.

Increased vegetative density and cover resulting from implementation of grazing systems and reductions in utilization would decrease soil erosion in the ES Area. Increased cover would provide more protection from raindrop impact, and increased density would disrupt erosive surface runoff. Increased root density would also help hold the soil in place. The magnitude of this impact is difficult to quantify. Table 2-9 summarizes the anticipated changes in sediment yield for the range site soil groups described in Table 2-8. Table 2-10 presents a comparison of the sediment yield classes by range site for the Existing Environment, the Proposed Action, and alternatives. Changes in sediment yield were estimated with the PSIAC method (1968) described in Appendix 3, p. A-73, and were based on predicted changes in runoff (precipitation intensity) calculated in the Water Resources Section, vegetative cover calculated in the Vegetation Section, soil surface factors (SSFs), and land use (i.e., forage utilization as described in the AMPs). A complete discussion of the assumptions used in calculating future sediment yields is presented in Appendix 3, p. A-74. Most soils would show decreased sediment yields compared to present conditions. This is a long-term, area-wide impact.

Proposed Action - Construction which requires excavation would increase water erosion susceptibility on 164 acres in the short term and 96 acres in the long term. Construction which does not require excavation would impact 417 acres in the short term and 243 acres in the long term.

For the total area sediment yields would decrease 26 percent from the existing 1,410 to 1,555 acre-feet per year to 1,055 to 1,170 acre-feet per year in the long term. The average annual sediment yield per square mile would be .54 acre-feet. The most significant decrease in sediment yield would occur on bottomland WP-2 and CP, with a 35-to 37-percent decrease from the present average annual yield of 1.0 to 1.5 acre-feet per square mile. The decrease in sediment yield is due to a 10-percent increase in vegetative cover on these range sites and an improved SSF condition (average is presently 46 for CP and 78 for WP-2; with the Proposed Action it would be 37 for CP and 63 for WP-2) (Appendix 3, PSIAC Method, Factor 8, p. A-73). Changes in runoff (precipitation intensity) and land use would not vary significantly between range sites. Soils in range sites where cover is not expected to increase would show the smallest decrease in sediment yield. Soils in the basalt hills WP-3, limestone hills WP-2, and malpais CP range sites would show the smallest decrease in sediment yield (19-percent average decrease from present sediment yields of .6 acre-feet per square mile per year, Table 2-11).

Presently, 12.4 percent of the soils in the ES Area are in the critical sediment yield class, 41.8 percent in the moderate class, and 37.8 percent in the slight class. For the Proposed Action 7.1 percent of the ES Area would be in the critical class, 21.0 percent in the moderate class, and 63.9 percent in the slight class.

No Action Alternative - Developments which require excavation would increase water erosion susceptibility on 31 acres in the short term and 19 acres in the long term. Developments which do not require excavation would impact 60 acres in the short term and 48 acres in the long term.

In the long term sediment yields would be reduced 7 percent or 1,310 to 1,450 acre-feet per year from the existing 1,410 to 1,555 acre-feet per year. This is an average annual sediment yield of .67 acre-feet per square mile. This reduction in sediment yield is not as much as the Proposed Action (26 percent), because changes in cover, runoff, and SSFs are not as great. Soils on the 25 existing AMP allotments would have the same sediment yield as the Proposed Action, .54 acre-feet per square mile per year. On non-AMP allotments there would not be any reduction in sediment yield from the present, because grazing sys-

TABLE 2-11

PERCENT SEDIMENT YIELD REDUCTION BY RANGE SITES IN THE LONG TERM

Range Site and MLRA		EE Sediment Yield Ac-Ft/Mi Sq/Yr	NA/FE* %	PA %	LA %	PCL/ESR %	NG** %
Basalt Hills	WP-3	.55	0	20	18	24	45
Bottomland	WP-2	1.30	17	35	25	35	54
	WP-3	1.50	15	23	20	28	50
	SD	.42	10	26	19	29	50
	CP	1.15	0	37	26	39	54
Deep Sand	SD	.35	3	26	20	29	49
Gravelly	WP-3	.44	14	30	23	34	55
	SD	.40	10	23	18	28	50
	CP	.38	18	24	18	29	50
Gypsum	SD	.70	0	24	20	26	50
	CP	.70	3	26	20	29	49
Gypsum Hills	CP	2.05	8	27	22	29	51
Hills	WP-3	.79	1	29	24	30	52
	CP	2.90	7	21	17	28	29
Limestone Hills	WP-2	.60	5	20	17	27	48
	WP-3	.52	0	27	23	33	50
	SD	.45	7	24	20	31	53
	CP	.55	5	27	27	33	49
Loamy	WP-2	1.00	12	25	21	30	45
	WP-3	.73	3	29	21	32	52
	SD	.58	10	28	22	31	50
	CP	.58	3	24	22	31	48
Malpais	WP-2	.68	15	29	22	35	50
	WP-3	.45	0	22	20	27	51
	SD	.29	0	28	24	31	52
	CP	.65	0	18	15	23	46
Sandstone Hills	WP-2	.60	8	25	17	30	48
Sandy	WP-2	.53	17	28	21	30	51
	WP-3	.55	7	27	20	31	49
	SD	.34	6	29	21	35	50
	CP	.37	0	30	22	32	51
Shallow	WP-2	.58	0	24	17	31	50
	WP-3	.56	7	25	21	32	48
	CP	.55	0	27	20	33	47
Shallow Sandstone	WP-2	.73	8	23	21	27	49
Shallow Sandy	SD	.34	0	26	21	29	53
Total ES Area		.72	7	26	19	31	46

EE - Existing Environment
NA/FE - No Action Alternative and Future Environment
PA - Proposed Action
LA - Livestock Adjustment Alternative
PCL/ESR - Pasture Capacity Level and Enhancement of Sensitive Resource Values Alternatives
NG - No Grazing Alternative

* Represents the average for each range site for AMP, non-AMP, and remaining allotments. For 25 existing AMPs, reductions would be the same as PA. For non-AMPs and remaining allotments sediment yields would be same as EE.
**On public land

Source: Table 2-9

tems would not be implemented and utilization would not be reduced on these allotments. Average annual sediment yield would be .72 acre-feet per square mile. Total sediment yield by range site is presented in Table 2-9. Range site soil groups which have most of their acreage on the 25 existing AMP allotments would have lower sediment on non-AMP allotments.

Livestock Adjustment Alternative - Developments which require excavation would increase water erosion susceptibility on 31 acres in the short term and 19 acres in the long term. Developments which do not require excavation would impact 60 acres in the short term and 48 acres in the long term.

In the long term sediment yields would be reduced 19 percent from the existing 1,410 to 1,555 acre-feet per year to 1,135 to 1,255 acre-feet per year. The average annual sediment yield would be .58 acre-feet per square mile. This reduction in sediment yield is not as much as the Proposed Action (26 percent), because changes in cover, runoff, and SSFs are not as great. Soils in the bottomland WP-2 and CP, hills WP-3, limestone hills CP, and malpais SD range sites would reduce their sediment yields the most, averaging 25 percent (Table 2-11). Soils in the hills CP, limestone hills WP-2, sandstone hills WP-2, and shallow WP-2 range sites would have the smallest reductions in sediment yield, averaging 17 percent.

Pasture Capacity Level Alternative - Developments which require excavation would increase water erosion susceptibility on 164 acres in the short term and 96 acres in the long term. Developments which do not require excavation would impact 417 acres in the short term and 243 acres in the long term.

Sediment yields would be reduced 31 percent from the existing 1,410 to 1,555 acre-feet per year to 980 to 1,080 acre-feet per year. This represents an average annual sediment yield of .50 acre-feet per square mile. This reduction is due to an average 6-percent increase in cover, 31-percent decrease in land use, decrease in runoff (precipitation intensity), and improved SSFs. Soils in the bottomland CP range site would have the greatest decrease in sediment yield, 39 percent. Soils in the malpais CP range site would have the least reduction in sediment yield, 23 percent.

Enhancement of Sensitive Resource Values Alternative - Developments which require excavation would increase water erosion susceptibility on 164 acres in the short term and 96 acres in the long term. Developments which do not require excavation would impact 443 acres in the short term and 248 acres in the long term.

Sediment yields would be reduced 31 percent from the existing 1,410 to 1,555 acre-feet per year to 980 to 1,080 acre-feet per year. This represents an average annual sediment yield of .50 acre-feet per square mile. This reduction is due to an average 6-percent increase in cover, 31-percent decrease in land use, decrease in runoff (precipitation intensity), and improved SSFs. Soils in the bottomland CP range site would have the greatest reduction in sediment yield, 39 percent. Soils in the malpais CP range site would have the smallest decrease in sediment yield, 23 percent.

No Grazing Alternative - A total of 1,475 acres in the short term and 295 acres in the long term would be impacted by the construction of 1,475 miles of fences. Area-wide increases in sediment yield would be small and unmeasurable when considered within the entire ES Area.

Under this alternative sediment yields would decrease the most, 46 percent, on public lands. Existing sediment yields of 1,410 to 1,555 acre-feet per year on 2,060 square miles would be reduced to 455 to 500 acre-feet per year on 1,231 square miles. The average sediment yield for the Existing Environment is .72 acre-feet per square mile per year. For the No Grazing Alternative it would be .39 acre-feet per square mile per year on public land only. Percent cover would increase an average of 4.4 percent by range site; land use would decrease by 70 percent on public lands; and runoff (precipitation intensity) and SSFs would be reduced in the long term. Soils in the bottomland WP-2 and CP and gravelly WP-3 range sites would have the greatest decreases in sediment yield, 54 to 55 percent. Soils in the hills CP range site would have the smallest decrease in sediment yield, 29 percent. On State and private lands runoff, utilization, SSFs, and vegetative density and cover would not change, so the sediment yield would be the same as present, 1,410 to 1,555 acre-feet per year.

WIND EROSION

The construction of range developments would increase the susceptibility of affected soils to erosion from blowing wind. Removal of vegetation during construction would expose more soil surface to strong winds. Soil structure would break down, thus increasing the soil's susceptibility to wind erosion. Soils in WEGs 1 and 2 (soils with sandy surfaces) would be most susceptible to increased wind erosion due to the disturbance or removal of vegetation (Table 2-8, Column K).

Increased vegetative density and cover (Appendix 3, Table A-20, p. A-75) resulting from improved grazing management should decrease wind erosion of soils. Increased vegetative cover would protect the soil from blowing wind. Increased root density would help hold the soil in place. Quantita-

tive data is not available; qualitative data is inversely related to increased vegetative density and cover. This would be a long-term, area-wide impact.

Proposed Action - Construction would increase wind erosion susceptibility on 580 acres in the short term and 339 acres in the long term. Wind erosion susceptibility for the total area would decrease because of increases in vegetative density and cover. Existing cover averages 34.1 percent by range site. With the implementation of the Proposed Action it would average 36.8 percent, a 2.7-percent increase (Appendix 3, Table A-20, p. A-75). This would decrease the susceptibility of soils to wind erosion.

No Action Alternative - Construction would increase wind erosion susceptibility on 90 acres in the short term and 67 acres in the long term. Cover would increase (from the existing average of 34.1 percent) an average of 2.7 percent by range site on the 25 existing AMP allotments. The increase in vegetative density and cover would decrease the susceptibility of soils to wind erosion. On non-AMP allotments there would not be any increase in vegetative density and cover; and, therefore, no decrease in wind erosion susceptibility because grazing systems would not be implemented and utilization would not be reduced on these allotments.

Livestock Adjustment Alternative - Construction would increase wind erosion susceptibility on 90 acres in the short term and 67 acres in the long term. Wind erosion susceptibility for the total area would decrease because vegetative density and cover would increase (from the existing average of 34.1 percent) an average of 2 percent for each range site. The increased cover would decrease the susceptibility of soils to wind erosion an unmeasurable amount.

Pasture Capacity Level Alternative - Construction would increase wind erosion susceptibility on 580 acres in the short term and 339 acres in the long term. Wind erosion susceptibility for the total area would decrease, because cover would increase (from the existing average of 34.1 percent) an average of 5.8 percent for each range site (Appendix 3, Table A-20, p. A-75).

Enhancement of Sensitive Resource Values Alternative - Construction would increase wind erosion susceptibility on 607 acres in the short term and 344 acres in the long term. Wind erosion susceptibility for the total area would decrease because of increases in vegetative density and cover. The long-term increase in cover would be the same as the Pasture Capacity Level Alternative, 5.8 percent. In the short term livestock grazing would be eliminated from an additional 184,802 acres which have 30 percent or more of the pasture in poor range condition and/or critical or severe erosion condition. An additional 360 acres of deep sand soils (the most susceptible to wind erosion) in poor range condition would also not be grazed under this alternative. Wind erosion susceptibility would significantly decrease on these rested areas. Grazing would be allowed on individual pastures as range or watershed conditions improve.

No Grazing Alternative - The construction of 1,475 miles of fences would increase wind erosion susceptibility on 1,475 acres in the short term and 295 acres in the long term where vegetation would be disturbed, exposing more surface soil to winds. Vegetative density and cover would increase (from the existing average of 34.1 percent) an average of 4.4 percent in the long term on public lands (Appendix 3, Table A-20, p. A-75). Increased cover would decrease the soil's susceptibility to wind erosion an unmeasurable amount. On State and private lands density and cover are not expected to change, so wind erosion susceptibility would not change.

CUMULATIVE IMPACTS

Proposed Action - Sediment yield would be reduced approximately 26 percent with the Proposed Action from a range of 1,410 to 1,555 acre-feet per year to 1,055 to 1,170 acre-feet per year, an average of .54 acre-feet per square mile per year. The reduction in sediment yield would be due to an increase in vegetative density and cover, a reduction in runoff and land use, and improved SSF condition resulting from improved grazing management.

No Action Alternative - Sediment yield would be reduced approximately 7 percent from the existing range of 1,410 to 1,555 acre-feet per year to 1,310 to 1,450 acre-feet per year, an average of .67 acre-feet per square mile per year.

Livestock Adjustment Alternative - Sediment yield would be reduced approximately 19 percent from the existing range of 1,410 to 1,555 acre-feet per year to 1,135 to 1,255 acre-feet per year, an average of .58 acre-feet per square mile per year.

Pasture Capacity Level Alternative - Sediment yield would be reduced approximately 31 percent from the existing range of 1,410 to 1,555 acre-feet per year to 980 to 1,080 acre-feet per year, an average of .50 acre-feet per square mile per year.

Enhancement of Sensitive Resource Values Alternative - Sediment yield would be reduced approximately 31 percent from the existing range of 1,410 to 1,555 acre-feet per year to 980 to 1,080 acre-feet per year, an average of .50 acre-feet per square mile per year.

No Grazing Alternative - Sediment yield would be reduced approximately 46 percent on public land from the existing range of 1,410 to 1,555 acre-feet per year for the entire ES Area (2,060 square miles) to 455 to 500 acre-feet per year on 1,231 square miles of public land, an average of .39 acre-feet per square mile per year.

Irreversible and Irretrievable

Topsoil that is displaced by erosion as a direct result of the Proposed Action is irretrievable. However, sediment yields with the Proposed Action are estimated to be reduced approximately 18 to 37 percent annually from the existing yields of 1,410 to 1,555 acre-feet per year (See Table 2-11).

WATER RESOURCES

Existing Environment

SURFACE WATER RESOURCES

The ES Area lies within four principal drainage areas: the Rio Salado watershed, the lower Rio Puerco watershed, the Jornada del Muerto closed basin, and areas draining directly into the Rio Grande. The area is in the arid and semiarid climatic zones, and surface water is relatively scarce.

The Rio Grande is the only perennial stream in the area. It enters about l5 miles south of Belen and continues southward through the center of the area until it reaches the Elephant Butte Marsh Area near the Sierra County line. Several tributaries, including the Rio Puerco and Rio Salado, enter the Rio Grande from the west as it travels through the area. Several small arroyos and dry washes enter the river from the east (New Mexico State Engineer's Office, 1974). Flow within almost all tributaries comes only in response to storm events. The main flow of the Rio Grande is completely controlled, and most flow is conveyed downstream in a series of irrigation canals. There are appreciable amounts of water in the main channel of the Rio Grande only in periods of high flow.

The Rio Puerco is the largest of the New Mexico tributaries to the Rio Grande with a watershed area of 7,340 square miles. From its clear, perennial headwaters in the Sierra Nacimiento and San Pedro Mountains, the Rio Puerco winds through the severely-eroded Colorado Plateau, picking up inordinately large amounts of sediment. By the time the Rio Puerco enters the area, it flows only intermittently and is one of the most sediment-laden streams in the Nation (U. S. Army Corps of Engineers, 1972). Approximately 850 square miles of the lower Rio Puerco basin lie in the area, and the only major tributaries to the river in this area are Arroyo Colorado and Arroyo Monte Largo.

The Rio Salado watershed adjoins the Rio Puerco watershed on the south and forms the other major tributary to the Rio Grande in the area. The stream rises on the eastern slope of the Datil Mountains and flows 86 miles eastward to its confluence with the Rio Grande near San Acacia, about 8 river miles downstream from the Rio Puerco confluence. The Rio Salado is an ephemeral stream through most of its length flowing only in response to storm events. Perennial flow does occur below a spring on allotment 121 (T. 1 N., R. 2 W., Sec. 7) and continues approximately 12 miles downstream to the Sevilleta Land Grant where it disappears into the channel bottom. The major tributaries in this basin of about 1,400 square miles are Alamocito Creek, Gallegos Creek, Canon Bonito, Jaralosa Canyon, Bear Springs Wash, and La Jencia Creek; all are ephemeral streams. The Rio Salado contributes large quantities of suspended sediment and bedload to the Rio Grande (U. S. Army Corps of Engineers, 1972).

The other major watershed is the Jornada del Muerto closed basin. This basin lies east of the Rio Grande, separated from the river by the low Fra Cristobal and Caballo Mountains. It covers an area of 3,475 square miles and receives ephemeral streamflow from the Sierra Oscura and San Andres Mountains to the east, as well as, the aforementioned mountains to the west. At the north and south ends of the Jornada del Muerto, the divides between the basin and the adjacent Rio Grande Valley are low and indistinct. Much of the area might contribute runoff were it not for the very scant precipitation and low gradients which allow runoff to sink into the ground or evaporate before flowing any great distance (New Mexico State Engineer's Office, 1967).

There is very little other surface water. The smaller stream courses contain only ephemeral flow, except for short reaches below springs and seeps. Perennial flow (in Ponia Creek, Arroyo Salado, Ojo Saladito, Arroyo Monte Largo, and Salt Spring in the Rio Puerco drainage, and Arroyo de las Canas in the Rio Grande drainage) is limited to reaches of 2 miles or less. There are no natural lakes or ponds, and earthen reservoirs designed to catch and store storm runoff are dry most of the year. All calculations in this section are based on two representative watersheds in each of these four principal drainage areas.

RUNOFF AND INFILTRATION

Runoff over the entire area averages 0.1 inches or less each year, except at higher elevations

(e.g., Ladron Peak) where there may be as much as 0.5 inches annually. Summer thunderstorm activity generates the greatest percentage of the annual runoff. Analysis of monthly streamflow records indicates that 80 percent of the annual runoff comes in response to thunderstorms, with 18 percent of the annual runoff coming from cyclonic storms and only 2 percent coming from snowmelt (Kantz et al 1977).

Runoff generated from summer thunderstorms often occurs as brief periods of high flow in the ephemeral channels that drain most of the area. Where watershed conditions favor rapid runoff, flash flooding is common. The magnitude of the flooding depends on the amount of precipitation received and various watershed characteristics, including drainage area, vegetative cover, and soil types. Streamflow data for these ephemeral channels is not available; therefore, flood estimates must be based on empirical relationships. Runoff volumes and peak flows for the ephemeral streams were calculated using the Soil Conservation Service's Unit Hydrograph approach (USDA-SCS, 1972). Selection of these representative watersheds was based on drainage area, amount of public lands subject to the Proposed Action, dominant vegetative type, and dominant hydrologic soil type. Map 2-5 depicts the location of these watersheds in the ES Area, and Table 2-12 summarizes the physical characteristics of each watershed. A complete analysis of the methods used in selecting watersheds and estimating flood peaks is presented in Appendix 4, p. A-78.

Streamflow also shows strong seasonal trends, with the Rio Puerco and Rio Salado experiencing 64 and 88 percent, respectively, of their total annual runoff in the summer months. Maximum discharge recorded for the Rio Puerco at Bernardo is 18,800 cfs while the maximum recorded flow for the Rio Salado at San Acacia is 36,200 cfs (USGS, 1975). Table 2-13 presents a comparison of runoff estimates for the Existing and Future Environments and the predicted impacts of the Proposed Action and alternatives.

Infiltration is one of the major factors influenced by grazing which in turn affects runoff, flooding, and erosion. Improper grazing can cause a reduction in the amount of cover. This would make soil more susceptible to erosion and decrease infiltration, thereby increasing runoff. Proper grazing can produce increased infiltration rates. Infiltration rates are best described in terms of hydrologic soil groups.

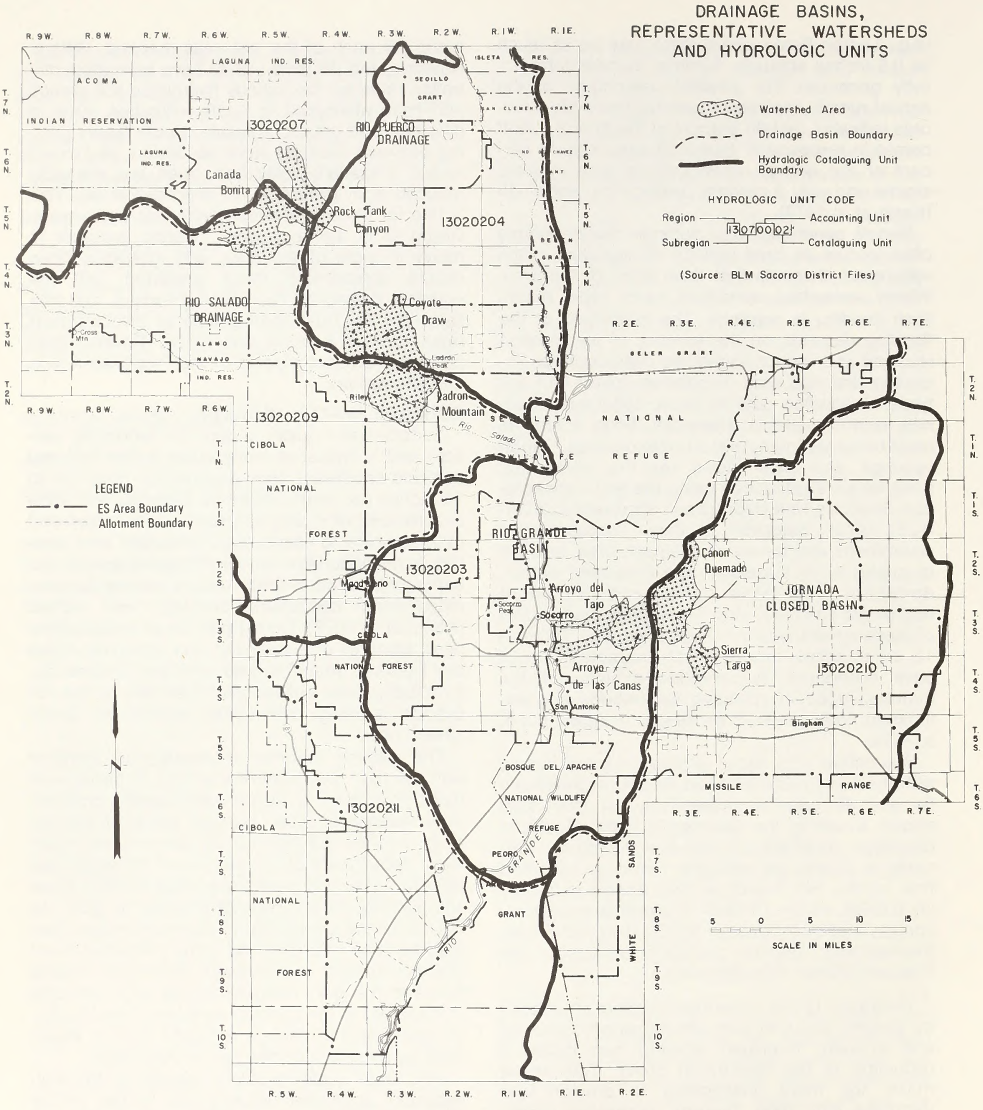
All hydrologic soil groups in the ES Area indicate a high degree of variability in infiltration rates. Table 2-8 in the Soils Section gives the hydrologic group for each of the soil units mapped. Gifford, Hawkins, and Williams (1975) have estimated infiltration rates for the various hydrologic soil groups and have attempted to relate infiltration rates to differences in grazing pressure. Under heavy grazing pressure (defined here as 60- to 80-percent forage utilization), infiltration rates are markedly reduced from infiltration on ungrazed areas. This is true for three of the four hydrologic soil groups; Group D is the exception. Grazing pressure is heavy in most of the area, and infiltration rates should approximate those predicted with the equation developed by Gifford, Hawkins, and Williams (1975). Table 2-14 compares the infiltration rates for the Existing and Future Environments and the predicted impacts of the Proposed Action and alternatives.

SURFACE WATER QUALITY

Surface water quality is poor and extremely variable and is typical of many areas in the arid and semiarid southwest. High evaporation rates (50 to 70 inches per year), extensive seepage, and wide occurrences of readily leachable salts in soil and rock combine to create high, dissolved solid content in many surface waters. Prevalent anions and cations dissolved in these waters include calcium, magnesium, carbonate, chloride, and sulfate (Kantz et al 1977). During periods of precipitation, large amounts of suspended and dissolved solids are leached from the land and the streambeds. Eventually these solids make their way to the Rio Grande causing detrimental effects on downstream uses.

The intense summer thunderstorms combine with the high erodibility of the soils to make sediment production a major water quality problem. Poor vegetative cover exposes much of the soil surface to the full force of raindrop impact resulting in detachment of soil particles. Poor vegetative density allows unimpeded sheetflow to carry these soil particles to the nearest channel or gully. As flow is concentrated into these steep-walled gullies, the susceptibility of the gully to headward and channel erosion is increased. Often the vertical banks of the gully collapse adding large amounts of sediment to the concentrated flow. The quantity of sediment that can be removed from a watershed by these processes can be very large.

The water quality problem created by the high sediment production is reflected in the annual sediment yields for the Rio Puerco and Rio Salado. Average annual sediment yield for the Rio Salado is 2,147,627 tons (1,556 tons per square mile), with annual yields as high as 4,645,461 tons. Average annual sediment yield for the Rio Puerco is 6,037,521 tons (413 tons per square mile), with annual yields as high as 18,315,560



MAP 2-5. Drainage Basins, Representative Watersheds and Hydrologic Units

TABLE 2-12

PHYSICAL PARAMETERS OF REPRESENTATIVE WATERSHEDS

Parameters	Jornada Closed Basin 30% of ES Area		Rio Grande Tributaries 38% of ES Area		Rio Puerco Drainage 17% of ES Area		Rio Salado Drainage 15% of ES Area	
	Sierra Larga	Canon Quemado	Arroyo del Tajo	Arroyo de Las Canas	Rock Tank Canyon	Coyote Draw	Ladron Mountain	Canada Bonita
Outlet Location	T.4S.,R.3E., SE 14	R.3S.,R.3E., NW 28	T.3S.,R.1E., SE 17	T.3S.,R.1E., SE 29	T.6N.,R.5W., SW 13	T.3N.,R.3W., NE 4	T.2N.,R.3W., Sec. 33	T.4N.,R.5W. SW 5
Area (sq. miles)	8.6	21.2	7.3	25.3	18.8	45.8	12.4	26.4
Channel Gradient (Percent Slope)	2.5	2.0	2.0	2.0	1.0	2.0	5.5	1.0
Main Channel Length (miles)	4.8	9.0	7.4	15.3	6.1	14.3	3.8	8.1
Cumulative Channel Length (miles)	14.4	66.7	22.9	52.3	19.4	43.5	17.1	51.9
Elevation Gain in Channel (feet)	600	1,460	800	1,100	400	800	2,240	1,300

Source: BLM Socorro District Files

TABLE 2-13

A COMPARISON OF RUNOFF ESTIMATES FOR REPRESENTATIVE WATERSHEDS
(All values are in cfs)

LONG-TERM VALUES

	EE	PA	NA/FE	LA	PCL	ESR	NG /1
Jornada Closed Basin							
Sierra Larga (Small)							
2-Year Flood	508	471	498	482	432	432	457
5-Year Flood	1,078	1,020	1,061	1,037	958	958	997
10-Year Flood	1,790	1,713	1,768	1,736	1,630	1,630	1,682
25-Year Flood	2,615	2,519	2,588	2,547	2,416	2,416	2,481
Canon Quemado (Large)							
2-Year Flood	272	256	266	261	177	177	149
5-Year Flood	828	798	817	808	643	643	586
10-Year Flood	1,621	1,577	1,605	1,591	1,345	1,345	1,258
25-Year Flood	2,608	2,551	2,587	2,569	2,242	2,242	2,125
Rio Grande Tributaries							
Arroyo Del Tajo (Small)							
2-Year Flood	558	543	549	530	513	513	516
5-Year Flood	1,008	987	996	970	946	946	950
10-Year Flood	1,535	1,508	1,519	1,486	1,456	1,456	1,460
25-Year Flood	2,118	2,086	2,099	2,060	2,024	2,024	2,029
Arroyo De Las Canas (Large)							
2-Year Flood	448	434	446	443	357	357	333
5-Year Flood	989	966	986	981	842	842	803
10-Year Flood	1,678	1,646	1,675	1,666	1,477	1,477	1,423
25-Year Flood	2,483	2,443	2,477	2,468	2,231	2,231	2,163
Rio Puerco Drainage							
Rock Tank Canyon (Small)							
2-Year Flood	1,544	1,355	1,490	1,384	1,236	1,236	1,364
5-Year Flood	2,838	2,570	2,762	2,611	2,396	2,396	2,582
10-Year Flood	4,363	4,020	4,267	4,073	3,797	3,797	4,037
25-Year Flood	6,060	5,650	5,946	5,713	5,380	5,380	5,670
Coyote Draw (Large)							
2-Year Flood	311	311	311	311	143	143	67
5-Year Flood	1,811	1,811	1,811	1,811	1,329	1,329	1,053
10-Year Flood	4,363	4,363	4,363	4,363	3,356	3,556	3,068
25-Year Flood	7,799	7,799	7,799	7,799	6,662	6,662	5,960

TABLE 2-13 (continued)

A COMPARISON OF RUNOFF ESTIMATES FOR REPRESENTATIVE WATERSHEDS
(All values are in cfs)

LONG-TERM VALUES

	EE	PA	NA/FE	LA	PCL	ESR	NG /1
Rio Salado Drainage							
Ladron Mountain (Small)							
2-Year Flood	883	883	883	883	511	511	424
5-Year Flood	2,236	2,236	2,236	2,236	1,577	1,577	1,411
10-Year Flood	4,050	4,050	4,050	4,050	3,104	3,104	2,858
25-Year Flood	6,235	6,235	6,235	6,235	5,009	5,009	4,684
Canada Bonita (Large)							
2-Year Flood	803	737	785	748	673	673	720
5-Year Flood	1,879	1,770	1,850	1,788	1,665	1,665	1,743
10-Year Flood	3,280	3,130	3,240	3,155	2,984	2,984	3,092
25-Year Flood	4,939	4,751	4,889	4,782	4,564	4,564	4,702

EE - Existing Environment
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NA/FE - No Action Alternative and Future Environment
LA - Livestock Adjustment Alternative
PCL - Pasture Capacity Level Alternative
ESR - Enhancement of Sensitive Resource Values Alternative
NG - No Grazing Alternative

/1 Under the No Grazing Alternative only 52 percent of the land (public land) would not be grazed. The remaining 48 percent (private and other) would continue under heavy (60 to 80 percent) grazing.

Source: BLM Socorro District Files

TABLE 2-14

A COMPARISON OF INFILTRATION RATES
(Infiltration rates are in inches per hour)

		EE	PA	NA/FE	LA	PCL	ESR	NG /1
Forage Utilization		60-80%	40-60%	60-80%	40-60%	20-40%	20-40%	0
Grazing Pressure		Heavy	Mod.	Heavy	Mod.	Light	Light	Ungrazed
Infiltration	A	1.29	2.36	1.29	2.36	2.36	2.36	2.50
Rate By	B	.95	1.59	.95	1.59	1.59	1.59	2.13
Hydrologic	C	.64	.88	.64	.88	.88	.88	.88
Soil Group	D	.25	.25	.25	.25	.25	.25	.25
Weighted Average		.64	.98	.64	.98	.98	.98	1.19

/1 The ungrazed conditions would only exist on public land; it is assumed that private and State land would continue to be under heavy grazing pressure.

EE - Existing Environment
PA - Proposed Action
NA/FE - No Action Alternative and Future Environment
LA - Livestock Adjustment Alternative
PCL - Pasture Capacity Level Alternative
ESR - Enhancement of Sensitive Resource Values Alternative
NG - No Grazing Alternative

Hydrologic Soil Groups: A - Most infiltration/least runoff
B,C - Intermediates
D - Least infiltration/most runoff

Source: BLM Socorro District Files

tons (USGS, 1948-75). Monthly sediment yield data for the two rivers indicates that July, August, and September contribute approximately 17, 45, and 20 percent, respectively, of the total annual sediment produced from these watersheds (Kantz et al 1977); thus, sediment production is greatest during the period of intense thunderstorm activity.

In the stretch of the Rio Grande downstream from Albuquerque, higher than desirable concentrations of iron, manganese, nitrogen compounds, phosphorus compounds, and coliform bacteria have been recorded (New Mexico Water Quality Commission, 1975).

Water in the Rio Puerco and Rio Salado is also very poor in quality. Sediment concentrations greater than 250,000 mg/1 have been recorded for the Rio Puerco and Rio Salado. In the period 1965-75, total dissolved solids (TDS) in the Rio Puerco reached concentrations as high as 9,060 mg/1; with sodium(2,300 mg/1), chloride (1,800 mg/1), and sulfate (4,100 mg/1) as the major dissolved solids. In the same period TDS in the Rio Salado ranged up to 3,000 mg/1; with sodium, calcium, bicarbonate, sulfate, and chloride as the major ions (USGS, 1965-75).

Water from other perennial stream reaches is also very poor in quality. Streamflow from seeps and springs in Arroyo Salado, Ojo Saladito, Arroyo Monte Largo, and Salt Spring is so salty that large salt deposits cover the streambed. Only Ponia Creek in the Rio Puerco drainage has good water quality.

The water quality of the earthen reservoirs is only slightly better than the quality of water in the perennial streams. Water, in these reservoirs which collect runoff from relatively small drainage areas, has not leached large amounts of salts from the land. Single measurements of the water quality of several earthen reservoirs revealed waters high in sulfate (221 mg/1), chloride (702 mg/1), bicarbonate (555 mg/1), calcium (644 mg/1), sodium (314 mg/1), and organic nitrogen (985 mg/1) (Kantz et al 1977).

Surface water is used for livestock and wildlife watering, irrigation purposes, and domestic use. Most surface waters in the area are suitable for stock watering (Tables 2-15 and 2-16); however, sulfate concentrations in the Rio Puerco and Rio Salado are often above the recommended limit of 1,000 mg/1. Most waters are unsuitable for human consumption because of the unpalatable taste and laxative effect caused by the high salt content, especially sulfate (Table 2-17) (Kantz et al 1977). Irrigation water from the Rio Salado, Rio Puerco, and Rio Grande is often above the recommended levels for TDS (2,000 mg/1); however, many areas in New Mexico have used water with TDS values much higher than recommended because of soil types and available water supply (New Mexico Water Quality Control Commission, 1975).

The types of non-point pollutants from grazing have been identified as sediments, turbidity, pathogens, and nutrients. Of the four, sediments are the most important. These pollutants are, in some cases, difficult to identify and quantify (e.g., this natural sedimentation along with man-caused sedimentation).

GROUNDWATER RESOURCES

The type of aquifer, depth to groundwater, and well yields are highly variable in the ES Area. In general, depth to groundwater increases and well yields decrease with increasing distance from the Rio Grande.

The aquifers of the Rio Grande basin are predominantly of the valley fill and bedrock types. Valley fill aquifers include quaternary age alluvium and flood plain sediments that are saturated with water on the Rio Grande Valley floor and in the valleys of its major tributaries. Generally, large yields may be obtained from the valley fill aquifer in the inner Rio Grande where groundwater is used as a dependable source of municipal and irrigation water. The water table is within 6 or 8 feet of the ground surface near the river, and irrigation wells typically yield between 300 and 2,500 gallons per minute (Bushman, 1963). Away from the river the ground surface rises toward the mountains; but the water table rises very little. In these areas valley fill alluvium ranges from 100 to 400 feet deep; and the depth to water is often greater than 100 feet.

Bedrock aquifers in the Rio Grande basin are composed mostly of sandstone, conglomerate, or limestone (New Mexico State Engineer's Office, 1967). The most important bedrock aquifer, the Tertiary Santa Fe sandstone, is a very extensive and reliable aquifer which underlies the alluvium. The Santa Fe formation is favorable for development of wells yielding more than 100 gallons per minute (Spiegel, 1955).

Recharge to the Rio Grande aquifers is maintained by infiltration from the river which averages about 27 acre-feet per day. Recharge also occurs from precipitation and infiltration on adjacent mesas and from runoff and irrigation ditch flow (Theis and Taylor, 1939).

Groundwater resources in the Jornada closed basin are also of two general aquifer types. The uppermost stratigraphic unit of the basin is Bolson alluvium comprised of poorly sorted sands, gravels, and gypsiferous silts and clays. This important

TABLE 2-15

RECOMMENDED WATER QUALITY CRITERIA FOR LIVESTOCK AND WILDLIFE USE

Parameter	
Salinity	TDS of less than 3,000 mg/l very satisfactory for all livestock and poultry
	TDS between 5,000 to 7,000 mg/l suitable for cattle, sheep, swine, and horses, but not for lactating animals or poultry
	TDS above 10,000 mg/l not recommended for use
Chloride	1,500 mg/l or less suitable for all livestock and poultry
Fluoride	2.0 mg/l or less suitable for all livestock and poultry
Sulfate	1,000 mg/l or less suitable for most livestock 2,000 mg/l and above can be detrimental to cattle
Nitrate	100 mg/l or less suitable for livestock and poultry
Arsenic	0.2 mg/l or less suitable for livestock and poultry
Boron	5 mg/l or less suitable for livestock and poultry
Cadmium	0.05 mg/l or less suitable for livestock and poultry
Lead	0.1 mg/l or less suitable for livestock and poultry
Mercury	0.01 mg/l or less suitable for livestock and poultry
Selenium	0.05 mg/l or less suitable for livestock and poultry
Gross alpha radiation	15 pCi/l (EPA Drinking Water Standard)
Gross beta radiation	50 pCi/l (EPA Drinking Water Standard)

Sources: Federal Water Pollution Control Administration, 1968; and National Academy of Sciences and National Academy of Engineering, 1972

aquifer ranges up to 1,000 feet in thickness and produces sufficient yields for stock watering at depths of 30 to 400 feet (New Mexico Water Quality Control Commission, 1975). Recharge to this alluvium from the basin floor is minor compared to the channel infiltration that occurs in the ephemeral streams which drain surrounding mountainous areas. Recent channel alluvium is not considered to be an important aquifer, but rather a recharge source to the Bolson aquifer.

Other aquifers in the Jornada closed basin are the bedrock that underlie the Bolson alluvium. The Santa Fe and Datil formations mav underlie the basin at moderate depth; however, these formations appear unlikely to yield large quantities of water except where the Santa Fe formation is relatively thick. The Dakota sandstone and the San Andres limestone underlie the basin at great depth and produce moderate yields of poor quality water (New Mexico Geological Survey, 1955).

Groundwater resources in the Rio Puerco drainage are complex and variable. East of the Rio Puerco fault zone (where the Llano del Rio Puerco intersects the Lucero uplift) groundwater is found at depths less than 200 feet in Tertiary bedrock (probably the Santa Fe sandstone) and thick alluvium. West of the fault groundwater is found at depths of around 200 feet in 2 primary aquifers of sandstone and limestone (Titus, 1963). Many springs emerge near the fault zone.

Groundwater resources in the Rio Salado drainage are not well known. The general depth to groundwater is between 200 and 500 feet; locally, water is available at shallower depths in the recent alluvium of arroyos and streams (Kantz et al 1977). Generalized groundwater maps indicate that this area is underlain by a thick, extensive aquifer system which extends under the San Augustine Plains (USGS, 1972).

GROUNDWATER QUALITY

Groundwater quality is highly variable since wells and springs draw water from both shallow valley fill aquifers and deep bedrock aquifers. Shallow groundwater in the Rio Grande Valley is often highly mineralized due to repeated irrigation and seepage of surface water with high TDS content. Deeper wells in alluvium, especially near the Rio Grande Valley, have moderate salt contents, medium salinity hazards, and low sodium hazards (Titus, 1963). Bedrock aquifers, which are mainly limestone, are often high in dissolved solids (New Mexico State Engineer's Office, 1967). Springs east of the Rio Grande are high in TDS and sulfate, while springs west of the river are usually low in chloride and sulfate (Bushman, 1963). Groundwater in both the Rio Puerco and Rio Salado drainages is of poor to fair quality due to the abundance of soluble minerals in both alluvial deposits and bedrock formations found in this area (Spiegel, 1955). Some wells in the Rio Puerco and Rio Salado do have good water quality (less than 1,000 mg/1 TDS); it is mostly in places where recharge is by infiltration from surface runoff into alluvial fans or into broad, sandy arroyos (Spiegel, 1955). Groundwater in the Jornada basin is of poor chemical quality (New Mexico Geological Survey, 1955). The highly mineralized alluvium and bedrock deposits in the basin provide mostly saline groundwater that is not potable and often unfit for livestock (New Mexico Geological Survey, 1955). Relatively shallow wells (especially those in alluvial fan deposits) provide less saline water which is suitable for livestock and, in a few areas of the basin, for human consumption.

Groundwater in the area is used for livestock and wildlife watering, irrigation purposes, and domestic use. Using a consumptive rate of 12 gallons per day per animal unit, the 20,081 AUs presently consume approximately 269 acre-feet of water annually. Using a consumptive rate of 2 to 3 quarts per day per wildlife (deer and antelope) number, the 1981 wildlife numbers presently consume approximately 1.7 acre-feet per year. As most of this water is supplied by groundwater developments (approximately 80 percent), annual withdrawals for livestock and wildlife watering are estimated at 217 acre-feet. A comparison of livestock and wildlife water withdrawal is shown in Table 2-18. Since waters with TDS levels of 5,000 to 7,000 mg/1 are acceptable for livestock, most groundwater in the area is suitable for stock watering. There are, however, several wells east of the Rio Grande and in the Jornada closed basin which produce water unsuitable for irrigation or livestock use due to high concentrations of sulfate and TDS (Table 2-15). Fluoride concentrations and gross alpha radiation also exceed recommended values for irrigation in several wells. Very few wells produce water suitable for human consumption because of the high salt content, especially sulfate and chloride (Table 2-17). Gross alpha radiation and fluoride also exceed drinking water standards (Kantz et al 1977).

Future Environment

The distribution and quality of surface water and groundwater are not expected to change greatly in the long term. Vegetative cover is expected to increase an average of 1 percent, thus runoff and sediment yields in the long term should decrease slightly from the existing situation. Groundwater withdrawals for livestock watering are expected to increase from present level of 270.7 to 271.7 acre-feet in the long term. This should have an insignificant effect on the groundwater resources

TABLE 2-16

STATE OF NEW MEXICO WATER QUALITY STANOAROS FOR SURFACE WATERS IN ES AREA

Parameter	Standard
Dissolved oxygen	4.0 mg/1 or higher
pH	between 6 and 9 units
Temperature	32.2°C (90° F) or less
Fecal coliform bacteria	Monthly logarithmic mean of fecal coliform bacteria shall be less than 1,000/100 ml, and no more than 10 percent of the samples shall exceed 2,000/100 ml
TDS	1,500 mg/1 or less if flowing water with discharge of 100 cfs or more
Sulfate	500 mg/1 or less if flowing water with discharge of 100 cfs or more
Chloride	250 mg/1 or less if flowing water with discharge of 100 cfs or more
Gross alpha radiation /1	30 pCi/1
Gross beta radiation /1	3000 pCi/1

Study area is included in the following classification: Rio Grande Basin including the main stem of the Rio Grande from the headwaters of Elephant Butte Reservoir upstream to the Angostura Oiversion Works, including any flow below the perennial reaches of the Rio Puerco and Jemez River which enters the main stem of the Rio Grande.

/1 General radiological criteria as set forth in Part 4 of New Mexico Environmental Improvement Board Radiation Protection Regulations. Adopted June 16, 1973.

Source: New Mexico Water Quality Control Commission; 1973; revised 1977.

TABLE 2-17

WATER QUALITY CRITERIA FOR HUMAN CONSUMPTION

Parameter	Standard
Arsenic	0.05 mg/1 or less /1
Cadmium	0.010 mg/1 or less /1
Lead	0.05 mg/1 or less /1
Mercury	0.002 mg/1 or less /1
Nitrate (As N)	10.0 mg/1 or less /1
Selenium	0.01 mg/1 or less /1
Silver	0.05 mg/1 or less /1
Fluoride	12° C and below - 2.4 mg/1 or less /1 12.1 to 14.6° C - 2.2 mg/1 or less /1 14.7 to 17.6° C - 2.0 mg/1 or less /1 17.7 to 21.4° C - 1.8 mg/1 or less /1 21.5 to 26.2° C - 1.6 mg/1 or less /1 26.3 to 32.5° C - 1.4 mg/1 or less /1
Coliform bacteria	4 organisms/100 ml in more than one sample when less than 20 are examined monthly /1
Gross alpha radiation	15 pCi/1 /1
Gross beta radiation	50 pCi/1 /1
Ammonia*	0.5 mg/1 or less /2
Chloride*	250 mg/1 or less /2
Sulfate*	250 mg/1 or less /2

* Recommended criteria

Sources: /1 Environmental Protection Agency National Interim Primary Drinking Water Regulations, July 9, 1976 (41 FR28402), 40 CFR 141.

/2 Recommend criterion by panel on public water supplies. National Academy of Sciences and National Academy of Engineering. 1972. Water Quality Criteria. Washington, D.C. 594 pp.

TABLE 2-18

A COMPARISON OF GROUNDWATER WITHDRAWAL FOR LIVESTOCK AND WILDLIFE WATERING

	EE	PA		NA/FE		LA		PCL		ESR		NG	
		ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT
Livestock Animal Units	20,081	15,804	20,529	19,108	20,200	15,804	19,724	13,931	23,183	12,674	23,598	11,006	11,006
Groundwater Withdrawals acre-feet/year	269	212	275	256	271	212	264	187	311	169	316	147	147
Wildlife Numbers	1,981	1,981	2,096	1,981	1,998	1,981	2,045	1,981	2,106	1,981	2,112	1,981	2,053
Groundwater Withdrawals acre-feet/year	1.7	1.7	1.8	1.7	1.7	1.7	1.7	1.7	1.8	1.7	1.8	1.7	1.7
Total Withdrawals	270.7	213.7	276.8	257.7	272.7	213.7	265.7	188.7	312.8	170.7	317.8	148.7	148.7

ST - Short Term
LT - Long Term

EE - Existing Environment
PA - Proposed Action
NA - No Action Alternative and Future Environment
LA - Livestock Adjustment Alternative
PCL - Pasture Capacity Level Alternative
ESR - Enhancement of Sensitive Resource Values Alternative
NG - No Grazing Alternative

Source: Table A-24 and Table 2-28

in the area. The Future Environment is compared to the Existing Environment, Proposed Action, and the alternatives in Tables 2-13, 2-14, and 2-18.

Impacts

INFILTRATION

The removal or reduction of livestock would reduce grazing pressures from heavy to ungrazed and intermediate levels. This would lead to increased infiltration rates for most of the soils. Three hydrologic soil groups would have increased infiltration rates (Table 2-14). Soils in hydrologic group D would not change under reduced grazing pressure due to shallow soil development and clay layers which restrict infiltration. Increased infiltration would be a long-term, area-wide impact. The infiltration model developed by Gifford, Hawkins, and Williams (1975) uses the same equation to predict infiltration rates for both moderate and light grazing pressure. The impact due to construction would be insignificant.

Proposed Action - As grazing pressure decreases from heavy (60 to 80 percent) to moderate (40 to 60 percent), the average infiltration rate is expected to increase to .98 inches per hour. This would be a 53-percent change from the existing .64 inches per hour.

No Action Alternative - Because of continued heavy (60 to 80 percent) grazing, infiltration would remain at the existing level of .64 inches per hour.

Livestock Adjustment Alternative - As grazing pressure decreases from heavy (60 to 80 percent) to moderate (40 to 60 percent), the average infiltration rate is expected to increase to .98 inches per hour. This would be a 53-percent increase over the existing .64 inches per hour. The change would occur at the same rate as the Proposed Action.

Pasture Capacity Level Alternative - As grazing pressure decreases from heavy (60 to 80 percent) to light (20 to 40 percent), a moderate increase in infiltration is expected, with an average infiltration rate of .98 inches per hour. This would be a 53-percent increase over the existing .64 inches per hour. The change would occur sooner than under the Proposed Action because of the greater (-30 versus -43 percent) livestock adjustment.

Enhancement of Sensitive Resource Values Alternative - As grazing pressure decreases from heavy (60 to 80 percent) to light (20 to 40 percent), a moderate increase in infiltration is expected with an average infiltration rate of .98 inches per hour. This would be a 53-percent increase over the existing .64 inches per hour. The change would occur sooner than the Proposed Action because of the greater (-30 versus -52 percent) livestock adjustment.

No Grazing Alternative - As grazing pressure decreases from a heavy to an ungrazed condition, an increase in infiltration is expected on public land. An average infiltration rate of 1.19 inches per hour would be achieved only on public land. This would be an 86-percent increase over the existing .64 inches per hour. The private and State land would continue to be grazed at existing levels. The average infiltration rate would remain at .64 inches per hour.

RUNOFF

Increased vegetative cover resulting from reduced grazing pressures would lead to decreased runoff (Table 2-13). The actual change in runoff would vary locally, depending upon the soil type and the cover increases. Existing Environment and Proposed Action cover values for each watershed were taken from the range survey and AMP data (Appendix 2, p. A-47). The changes in cover values from Existing Environment to Proposed Action are generally small (Appendix 4, Table A-23, p. A-82). Conversion factors for the alternatives were used to calculate new cover values and are presented in Appendix 4, p. A-79. In some cases the cover change was so small (0 to 1 percent) that no new cover values could be calculated. The cover values were used to predict future flood estimates for eight representative watersheds (Table 2-13). The changes in runoff would be an area-wide, long-term impact. Because less than .05 percent of total acreage would be disturbed by construction, the impact to runoff would be insignificant.

Because only public land is removed from grazing, the values for runoff for the No Grazing Alternative are larger than those for the Pasture Capacity Level and Enhancement of Sensitive Resource Values Alternatives. Public land represents only about 52 percent of the ES Area. The remaining 48 percent (private and other) would continue to be grazed at existing levels.

Proposed Action - An average increase of 4 percent in vegetative cover would result in an average decrease of 3 percent in runoff.

No Action Alternative - An average increase of 1 percent in vegetative cover would result in an average decrease of 1 percent in runoff.

Livestock Adjustment Alternative - An average increase of 2 percent in vegetative cover would result in an average decrease of 3 percent in runoff.

Pasture Capacity Level Alternative - An average increase of 7 percent in vegetative cover would result in an average decrease of 12 percent in runoff.

Enhancement of Sensitive Resource Values Alternative - An average increase of 7 percent in vegetative cover would result in a 12-percent average decrease in runoff.

No Grazing Alternative - An average increase of 5 percent in vegetative cover would result in a 16-percent average decrease in runoff.

SURFACE WATER QUALITY

Reductions in runoff and sediment yields resulting from the reduced grazing pressures would produce a slight improvement in the quality of surface runoff. The result would be a small decline in suspended and dissolved solids, including major cations and anions. This long-term, area-wide impact cannot be quantified due to lack of historical data relating water quality to streamflow in ephemeral streams. The impact of construction would be insignificant on surface water quality. In the unique riparian areas vegetative improvement cannot be quantified. However, overall utilization is reduced from heavy to moderate. An insignificant improvement in water quality should result from the Proposed Action and the alternatives (Table 2-2).

Proposed Action - Because of an average runoff decrease of 3 percent, a slight improvement in surface water quality would be expected. This improvement cannot be quantified.

No Action Alternative - The average runoff decrease of 1 percent would not be enough to change surface water quality.

Livestock Adjustment Alternative - The runoff decrease of 3 percent would produce a slight increase in surface water quality. This improvement cannot be quantified.

Pasture Capacity Level Alternative - The runoff decrease of 6 percent would produce a slight increase in surface water quality. This improvement cannot be quantified.

Enhancement of Sensitive Resource Values Alternative - The runoff decrease of 12 percent would produce a slight increase in surface water quality. This improvement cannot be quantified.

No Grazing Alternative - The runoff decreases of 16 percent should improve surface water quality. This improvement cannot be quantified.

GROUNDWATER RESOURCES

Improved infiltration resulting from reduction of grazing pressure could increase the recharge to groundwater. The magnitude of this long- term, area-wide impact is difficult to predict. Table 2-14 presents infiltration rates for the hydrologic soil groups under the various grazing pressures expected with the Proposed Action and alternatives. Exactly how much of this infiltration would actually replenish groundwater is unknown. Any water infiltrating the soil would replenish soil moisture and is not likely to reach the water table.

Impact on groundwater quality would probably be insignificant. It would be difficult to measure the actual effect, if any, that grazing has on groundwater quality.

Table 2-18 shows the estimated groundwater withdrawals under the Proposed Action and alternatives. The amount of groundwater withdrawals was calculated based on cattle consuming 12 gallons of water per day and deer and antelope 2 to 3 quarts of water per day. The existing groundwater withdrawal is 271 acre-feet per year.

Proposed Action - The groundwater withdrawals would be 214 acre-feet per year in the short term and 277 acre-feet per year in the long term.

No Action Alternative - Groundwater withdrawals would be 258 acre-feet per year short term and 273 acre-feet per year long term.

Livestock Adjustment Alternative - Groundwater withdrawals would be 214 acre-feet per year in the short term and 266 acre-feet per year in the long term.

Pasture Capacity Level Alternative - Groundwater withdrawals would be 189 acre-feet per year in the short term and 313 acre-feet per year in the long term.

Enhancement of Sensitive Resource Values Alternative - Groundwater withdrawals would be 171 acre-feet per year in the short term and 318 acre-feet per year in the long term.

No Grazing Alternative - Groundwater withdrawals would be 149 acre-feet per year in both the short and long terms.

CUMULATIVE IMPACTS

Proposed Action - The 4-percent average increase in cover and the 53-percent average increase in the infiltration rate would result in a 4-percent average decrease in runoff. This is a long-term, area-wide impact and is not considered significant.

No Action Alternative - The 1-percent average increase in cover and the maintenance of the existing infiltration rate would result in a 1-percent average decrease in runoff. This is a long-term, area-wide impact and is not considered significant.

Livestock Adjustment Alternative - The 2-percent average increase in cover and the 53-percent average increase in the infiltration rate would result in a 3-percent average decrease in runoff. This is a long-term, area-wide impact and is not considered significant.

Pasture Capacity Level Alternative - The 7-percent average increase in cover and the 53-percent average increase in the infiltration rate would result in a 12-percent average decrease in runoff. This is a long-term, area-wide impact and is not considered significant.

Enhancement of Sensitive Resource Values Alternative - The 7- percent average increase in cover and the 53-percent average increase in the infiltration rate would result in a 12-percent average decrease in runoff. This is a long-term, area-wide impact and is not considered significant.

No Grazing Alternative - The 5-percent average increase in cover and the 86-percent average increase in the infiltration rate would result in a 16-percent average decrease in runoff. An average infiltration rate of 1.19 inches per hour would be achieved only on public land. The private and State land would continue to be grazed at existing levels. The average infiltration rate would remain at .64 inches per hour. This is a long-term, area-wide impact and is considered significant.

LIVESTOCK GRAZING

Existing Environment

INTRODUCTION

There are 102 BLM operators with grazing privileges in the East Socorro ES Area. The relationship of grazing in this area to livestock production at the national and State levels is shown below. Data is from Public Land Statistics (1976) and from Thomas (1973):

Cattle Production -
- in the U.S.
  - 11 western states - 19 percent
  - 11 western states (BLM) - 3.4 percent
  - New Mexico - .61 percent
  - New Mexico (BLM) - .2 percent
  - East Socorro ES Area - .01 percent
- in the 11 Western States
  - 11 western states (BLM) - 17.8 percent
  - New Mexico (BLM) - 1.19 percent
  - East Socorro ES Area - .06 percent
- in New Mexico
  - New Mexico (BLM) - 37 percent
  - East Socorro ES Area - 1.8 percent

OPERATIONS

At present there are 29 operators involved in the 25 existing AMP allotments (Appendix 1, Table A-1, p. A-1). The remaining 73 operators in the area operate 96 non-AMP allotments. Twenty-two (22) operators are combined in ten existing community allotments (Table 2-19).

LIVESTOCK

Cattle and horses are the only classes of livestock which are licensed in the ES Area. Some operators maintain a few horses which are used for ranch work or for breeding stock.

One hundred (100) of the operators have cow-calf operations. In these operations cows produce a calf crop each year. Some calves are retained for herd replacement, but most are sold between the ages of 6 and 12 months. Most operators have a yearlong breeding program. Although this results in calves being born throughout the year, most are born during spring and fall. Therefore, most calves are shipped to market from October through November.

Two operators run steer operations; therefore, a base breeding herd is not maintained. Weaned calves or yearling steers are obtained elsewhere, held on the allotment for a specified period, and then marketed. During periods of favorable moisture, some cow-calf operators will run a small scale steer operation with some of their weaned calves. This practice is in addition to their normal operation.

Hereford is the most common breed of cattle in the ES Area. Other breeds include: Angus, Brangus, Charolais, Brahma, and Santa Gertrudis. Cross breed cows are common, with the Hereford-Angus cross being most popular. However, most bulls are not cross breeds.

Actual livestock use data is unknown in much of the ES Area. Informal conversations with some allottees indicate they graze fewer AUMs than they are presently licensed for. By maintaining a high level of licensed use, some allottees can retain the option to vary the amount of livestock they graze up to the present licensed use without having to apply to BLM for changes. Maintaining a high licensed use also implies that the allotment can carry that number of livestock. This may tend to inflate the actual market value of the base property because its market value is often based on the existing grazing use and not on true grazing capacity.

SEASON OF USE

Yearlong use is allowed on 118 allotments involving 96 operators; seasonal use is allowed on 3 allotments involving 6 operators. Yearlong use provides grazing of livestock for 12 continuous months on all or part of an allotment.

Future Environment

The 29 operators included in the 25 existing AMP allotments would continue to operate under those plans. These 25 existing AMP allotments would be intensively managed. Operators would receive adjustments in grazing use on 19 of the 25 existing AMP allotments. Modifications to the existing grazing systems would occur on 15 AMP allotments. The remaining 91 operators who operate 96 non-AMP allotments and the two unallotted allotments would be managed as they are at present. The 102 operators would graze 20,200 AUs

TABLE 2-19

SUMMARY OF OPERATIONS AND LIVESTOCK NUMBERS

	EE		PA				NA/FE				LA				PCL				ESR				NG /1	
			Short Term		Long Term		Short Term		Long Term		Short Term		Long Term		Short Term		Long Term		Short Term		Long Term		Short & Long Term	
	Oper.	Allot.	Oper.	Allot.	Oper.	Allot.	Oper.	Allot.	Oper.	Allot.	Oper.	Allot.	Oper.	Allot.	Oper.	Allot.	Oper.	Allot.	Oper.	Allot.	Oper.	Allot.	Oper.	Allot.
AMP Operators																								
With One Allotment	18	18	41	41	41	41	18	18	18	18	18	18	18	18	41	41	41	41	38	38	41	41	0	0
With More Than One Allotment	1	3	5	13	5	13	1	3	1	3	1	3	1	3	5	13	5	13	5	13	5	13	0	0
Community Allotment	8	3	22	10	23	10	8	3	8	3	8	3	8	3	22	10	23	10	21	9	23	10	0	0
Community Allotment and Individual AMP Allot.	0	0	1	2	1	2	0	0	0	0	0	0	0	0	1	2	1	2	1	2	1	2	0	0
Non-AMP Operators																								
With One Allotment	44	44	13	13	14	14	44	44	44	44	38	39	40	40	13	13	14	14	12	12	14	14	70	58
With More Than One Allotment	15	39	0	0	0	0	15	39	15	39	15	39	15	39	0	0	0	0	0	0	0	0	17	51
Community Allotment	12	6	0	0	0	0	12	6	12	6	12	6	12	6	0	0	0	0	0	0	0	0	0	0
Community Allotment and Individual Non-AMP Allotment	2	4	0	0	0	0	2	4	2	4	2	4	2	4	0	0	0	0	0	0	0	0	0	0
Combined Non-AMP and AMP Operators																								
At Least One of Each	2	4	9	20	9	20	2	4	2	4	2	4	2	4	9	20	9	20	9	20	9	20	0	0
AMP and Non-AMP Community Allotment	0	0	1	2	1	2	0	0	0	0	0	0	0	0	1	2	1	2	1	2	1	2	0	0
AMP, Non-AMP and Community Non-AMP Allotment	0	0	1	3	1	3	0	0	0	0	0	0	0	0	1	3	1	3	1	3	1	3	0	0
Other Operators in Community Allotments Tallied Above	0	0	3	0	3	0	0	0	0	0	0	0	0	0	3	0	3	0	3	0	3	0	0	0
Sub Total	102	121	96	104	98	105	102	121	102	121	96	116	98	117	96	98	98	105	91	104	98	105	87	109
Elimination of Grazing Operators	0	0	6	5	4	4	0	0	0	0	6	5	4	4	6	5	4	4	11	10	4	4	15	14
Unallotted Allotments	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	0
GRAND TOTAL	102	123	102	111	102	111	102	123	102	123	102	123	102	123	102	111	102	111	102	111	102	111	102	123
Estimated Livestock AUs																								
Public		9,004		6,313		9,190		8,368		9,240		6,313		8,758		5,193		11,004		4,483		11,473		0
Private and State /2		11,077		9,491		11,339		10,740		10,960		9,491		10,966		8,738		12,179		8,191		12,125		11,006
Total /2		20,081		15,804		20,529		19,108		20,200		15,804		19,724		13,931		23,183		12,674		23,598		11,006

/1 Grazing would continue on State and private lands in these allotments.
/2 On Non-AMP allotment, non-public land AUMs were estimated.

EE - Existing Environment
PA - Proposed Action
NA/FE- No Action Alternative and Future Environment
LA - Livestock Adjustment Alternative
PCL - Pasture Capacity Level Alternative
ESR - Enhancement of Sensitive Resource Values Alternative
NG - No Grazing Alternative

Source: Summary of Appendix 1, Table A-1, p. A-1 and Appendix 5, Table A-24, p. A-83

(Table 2-19). There would be no new community allotments nor would additional operators be restricted to seasonal use.

Impacts

OPERATIONS

As the livestock adjustments and utilization levels change under the Proposed Action and alternatives, the number of operators who have AMP allotments, non-AMP allotments, or are eliminated from grazing would change. Also the number of operators combined into community allotments would vary. The proposed community allotments could limit the affected operators' livestock management practices, such as breeding programs, range developments, maintenance of range developments, breed of cattle, and supplemental feeding and salting.

Table A-24, Appendix 5, p. A-83, lists each operator and the allotment or allotments that he controls. The table shows the number of AUMs each operator would have in the existing situation, Proposed Action, and alternatives in the short and long terms. Table 2-19 summarizes the various kinds of operations (i.e., AMP, non-AMP, and/or community allotment) and the number of allotments involved. It also shows the estimated livestock AUs (including estimated AUs on non-public lands in non-AMP allotments) in the short and long term for the Proposed Action and alternatives.

Proposed Action - In the short term 74 operators would be operating AMP allotments; 13 operators would be operating non-AMP allotments; and 9 operators would be involved in both AMP and non-AMP allotments. Grazing would be eliminated on five allotments involving six operators. In the long term 75 operators would be operating AMP allotments; 14 operators would be operating non-AMP allotments; and 9 operators would be involved in both AMP and non-AMP allotments. Grazing would be eliminated on four allotments, all on public land, involving four operators. Ninety-six (96) operators would graze 15,804 AUs in the short term. Ninety-eight (98) operators would graze 20,529 AUs in the long term (Table 2-19).

Three community allotments are proposed in addition to the ten existing ones. Two operators would be combined into allotment 037 and two into allotment 271. The two operators in each of the proposed community allotments have been unofficially running the allotments together. Each pair of operators involved is related and has had combined operations for several years. There would be no impact on these operators. Three operators would be combined into allotment 250. Socorro District Office records indicate that none of the three are presently using their allotments. Therefore, prior to implementation of the AMP, a breed of cattle and management practices would have to be agreed upon. For the most part, community allotments would require more individual work from each operator, especially when personal conflicts arise and operators cannot work together as a group. Management of livestock would suffer. The impacts resulting from personal conflicts cannot be quantified with existing data.

No Action Alternative - The 29 operators included in the 25 existing AMP allotments would continue to operate under those plans. The 25 existing AMP allotments would be intensively managed. Operators would receive adjustments in grazing use on 19 of the 25 existing AMP allotments. Modifications to the existing grazing systems would occur on 15 AMP allotments. The remaining 73 operators who operate 96 non-AMP allotments and the 2 unallotted allotments would be managed as they are at present. One hundred and two (102) operators would graze 19,108 AUs in the short term and 20,200 AUs in the long term (Table 2-19). There would be no new community allotments.

Livestock Adjustment Alternative - The 29 operators included in the 25 existing AMP allotments would continue to operate under those plans. The 25 existing AMP allotments would be intensively managed. Operators would receive adjustments in grazing use on 19 of the 25 existing AMP allotments. Modifications to the existing grazing systems would occur on 15 AMP allotments. The remaining 67 operators who operate 91 non-AMP allotments would receive livestock adjustments. The two unallotted allotments would remain unallotted. These adjustments would cause grazing to be eliminated on five allotments involving six operators in the short term. In the long term grazing would be eliminated on four allotments, all public land, involving four operators (Appendix 1, Table A-1, p. A-1). Ninety-six (96) operators would graze 15,804 AUs in the short term. Ninety-eight (98) operators would graze 19,724 AUs in the long term (Table 2-19). There would be no new community allotments.

Pasture Capacity Level Alternative - In the short term 74 operators would be operating AMP allotments; 13 operators would be operating non-AMP allotments; and 9 operators would be involved in both AMP and non-AMP allotments. Grazing would be eliminated on five allotments involving six operators. In the long term 75 operators would be operating AMP allotments; 14 operators would be operating non-AMP allotments; and 9 operators would be involved in both AMP and non-AMP allotments. Grazing would be eliminated on four allotments, all on public land, involv-

ing four operators. Ninety-six (96) operators would graze 13,931 AUs in the short term. Ninety-eight (98) operators would graze 23,183 AUs in the long term (Table 2-19).

Three community allotments are proposed in addition to the ten existing ones. Two operators would be combined into allotment 037 and two into allotment 271. The two operators in each of the proposed community allotments have been unofficially running the allotments together. Each pair of operators involved is related and has had combined operations for several years. There would be no impact on these operators. Three operators would be combined into allotment 250. Socorro District Office records indicate that none of the three are presently using their allotments. Therefore, prior to implementation of the AMP, a breed of cattle and management practices would have to be agreed upon. For the most part, community allotments would require more individual work from each operator, especially when personal conflicts arise and operators cannot work together as a group. Management of livestock would suffer. The impacts resulting from personal conflicts cannot be quantified with existing data.

Enhancement of Sensitive Resource Values Alternative - In the short term 70 operators would be operating AMP allotments; 12 operators would be operating non-AMP allotments; and 9 would be involved in both AMP and non-AMP allotments. Grazing would be eliminated on ten allotments involving eleven operators. In the long term 75 operators would be operating under AMPs; 14 operators would be operating non-AMP allotments; and 9 operators would be involved in both AMP and non-AMP allotments. Grazing would be eliminated on four allotments, all on public land, involving four operators. Ninety-one (91) operators would graze 12,674 AUs in the short term. Ninety-eight (98) operators would graze 23,598 AUs in the long term (Table 2-19).

Three community allotments are proposed in addition to the ten existing ones. Two operators would be combined into allotment 037 and two into allotment 271. The two operators in each of the proposed community allotments have been unofficially running the allotments together. Each pair of operators involved is related and has had combined operations for several years. There would be no impact on these operators. Three operators would be combined into allotment 250. Socorro District Office records indicate that none of the three are presently using their allotments. Therefore, prior to implementation of the AMP, a breed of cattle and management practices would have to be agreed upon. For the most part, community allotments would require more individual work from each operator, especially when personal conflicts arise and operators cannot work together as a group. Management of livestock would suffer. The impacts resulting from personal conflicts cannot be quantified with existing data.

No Grazing Alternative - Grazing would be eliminated on all public land in the area. This would cause grazing to be eliminated on fourteen allotments, all on public land, involving fifteen operators. The remaining 87 operators would continue to run 11,006 AUs on private and State land that they own and/or control on 109 allotments (Table 2-19).

SEASON OF USE

Seasonal grazing refers to an allotment being available for use by domestic livestock only during a set period of time each year. If an allotment has a seasonal grazing system, then the allotment's operator would be required to find pasturage for his herd on other than public land during the period of time that grazing is prohibited, or he would have to sell his herd.

Proposed Action - Fourteen operators would have seasonal grazing systems in addition to the six existing seasonal use operators. Only three of the fourteen would be impacted because they do not have other pasturage. The three operators presently run 26, 8, and 2 AUs.

No Action Alternative - There would be no impact.

Livestock Adjustment Alternative - There would be no impact.

Pasture Capacity Level Alternative - Fourteen operators would have seasonal grazing systems in addition to the six existing seasonal use operators. Only three of the fourteen would be impacted because they do not have other pasturage. The three operators presently run 26, 8, and 2 AUs.

Enhancement of Sensitive Resource Values Alternative - Fourteen operators would have seasonal grazing systems in addition to the six existing seasonal use operators. Only three of the fourteen would be impacted because they do not have other pasturage. The three operators presently run 26, 8, and 2 AUs.

No Grazing Alternative - One of the six existing seasonal use operators, who is totally dependent upon public land grazing, would have his grazing use eliminated. The five other seasonal use operators could graze livestock on their private and State land.

CUMULATIVE IMPACTS

Proposed Action - In the long term 75 operators would be operating AMP allotments; 14 operators would be operating non-AMP allotments; and 9 operators would be involved on both AMP

and non-AMP allotments. Grazing would be eliminated on four allotments, all on public land, involving four operators. Ninety-eight (98) operators would graze 20,529 AUs. Three new community allotments are proposed involving seven operators. Fourteen operators would be restricted to seasonal use. Only three of the fourteen additional operators would be impacted as they do not have other pasturage.

No Action Alternative - The 29 operators included in the 25 existing AMP allotments would continue to operate under those plans. However, livestock adjustments would occur on 19 of the existing 25 AMP allotments and modifications to the existing grazing systems would occur on 15 AMP allotments. The remaining 73 operators who operate 96 non-AMP allotments and the 2 unallotted allotments would be managed as they are at present. One hundred and two (102) operators would graze 20,200 AUs in the long term.

Livestock Adjustment Alternative - The 29 operators included in the 25 existing AMP allotments would continue to operate under those plans. However, livestock adjustments would occur on 19 of the existing 25 AMP allotments and modifications to the grazing systems would occur on 15 AMP allotments. The remaining 67 operators who operate 91 non-AMP allotments and the 2 unallotted allotments would be managed as they are at present. Four allotments involving four operators, all on public land, would be eliminated from grazing. Ninety-eight (98) operators would graze 19,724 AUs in the long term.

Pasture Capacity Level Alternative - In the long term 75 operators would be operating AMP allotments; 14 operators would be operating non-AMP allotments; 9 operators would be involved in both AMP and non-AMP allotments. Grazing would be eliminated on four allotments, all on public land, involving four operators. Ninety-eight (98) operators would graze 23,183 AUs. Three new community allotments are proposed involving seven operators. Fourteen additional operators would be restricted to seasonal use. Only three of the fourteen operators would be impacted as they do not have other pasturage.

Enhancement of Sensitive Resource Values Alternative - In the long term 75 operators would be operating AMP allotments; 14 operators would be operating non-AMP allotments; 9 operators would be involved in both AMP and non-AMP allotments. Grazing would be eliminated on four allotments, all on public land, involving four operators. Ninety-eight (98) operators would graze 23,598 AUs. Three new community allotments are proposed involving seven operators. Fourteen additional operators would be restricted to seasonal use. Only three of the fourteen operators would be impacted as they do not have other pasturage.

No Grazing Alternative - Grazing would be eliminated on all public land in the area. This would cause grazing to be eliminated on fourteen allotments, all on public land, involving fifteen operators including one of the six existing seasonal use operators. The remaining 87 operators would continue to run 11,006 AUs on the private and State land they own and/or control.

SOCIO-ECONOMICS

Existing Environment

INTRODUCTION

The socio-economic impact area differs slightly from the ES Area in that the boundaries have been extended to include nearby trade centers (Map 2-6). Communities in or adjacent to the ES Area and their populations are: Socorro - 6,014, San Antonio - 475, Bingham - 6, Magdalena - 652, Polvadera - 350, Escondida - 36, Riley - 12, Belen - 5,825, and Los Lunas - 977. Bingham and Riley are the only communities within the boundaries. The area produces raw materials with little or no processing beyond the first stages. Livestock grazing is the traditional source of the local economy and surrounding areas. However, there is irrigated farmland scattered along the Rio Grande.

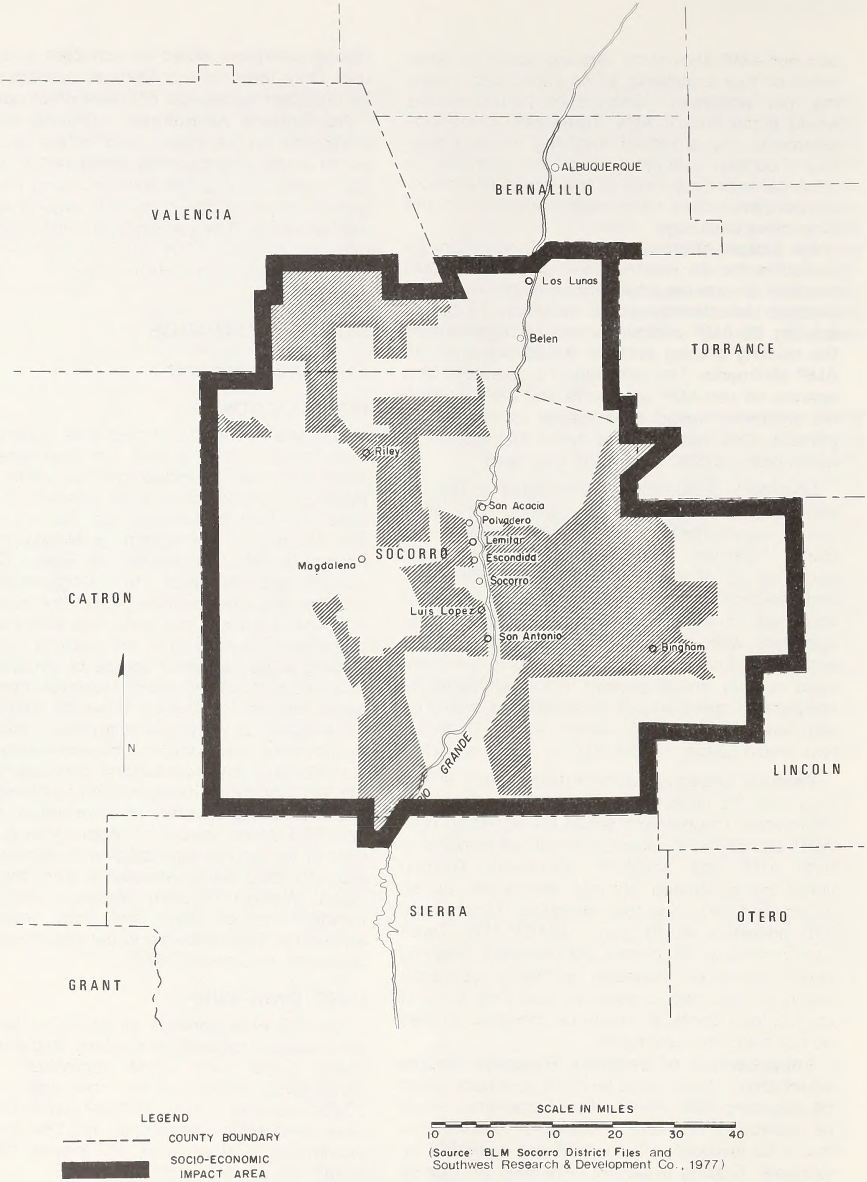
Persistent poverty, unemployment, and underemployment are dominant characteristics in Socorro County and surrounding counties. In October 1977 Socorro County ranked fourth highest of the State's 32 counties as recipient of financial and food stamp assistance. Approximately 21 percent of the County population was receiving financial and food stamp assistance from the State's Social Welfare Program. Valencia and Socorro Counties ranked 22nd and 25th, respectively, among the State's lowest in per capita income (U. S. Bureau of Census, 1970).

LAND OWNERSHIP

The ES Area consists of 1,650,214 acres (approximately 3 percent) of the total land area of the State (Table 2-20). BLM administers 838,808 acres (52.2 percent) of the area which includes 23,052 acres of Bureau of Reclamation (BR) land. State ownership consists of 293,158 acres (approximately 17.8 percent), and private ownership is 495,196 acres (30 percent).

LAND USE

In the ES Area 99.7 percent of the land is wildlands used primarily for grazing. The remaining



MAP 2-6. Socio-Economic Impact Area

uses include developed lands and roads. BLM manages grazing on public and BR lands. These lands supply 45 percent of the AUMs in the area (Appendix 6, Table A-25, p. A-88). Private and State land supply the remaining 55 percent of the AUMs.

The majority of recreational users in the area are from Belen, Los Lunas, and Socorro. The principal recreational activities pursued are hunting, sightseeing, and off-road vehicle (ORV) touring. There are no developed recreation sites within the ES Area. Developed recreation sites exist in the Cibola National Forest and in the communities of Belen and Socorro. Many hunters and recreationists visiting the area have campers or stay only for a day. Their purchases are generally minimal and, as a result, little income is derived from recreational activities.

POPULATION

The ES Area is a large, sparsely populated, rural area. There is no accurate method, except a census, for determining the exact population. However, the total population is estimated to be 1,167. Total ranch population is estimated to be 412 (Southwest Research and Development Company, 1977). Ninety (90) percent of the total ranch population live in Socorro County - population 9,899 (Bureau of Census, 1975). Of the 102 families utilizing public lands from grazing, 59 percent of the heads of household are between the ages of 50-69. Ninety-four (94) of these operators are resident ranchers or persons who live on or adjacent to their ranch holdings; 2 percent live in other counties; and 5 percent live out of state and maintain their ranches on an absentee basis during the year.

Data on racial/ethnic composition indicates that in Socorro County, 8,909 or 90 percent are Anglo or Hispanic (Bureau of Census, 1975). Hispanic makes up approximately 5,939 (66.6 percent) of the population and Anglo 2,970 (23.4 percent). The surrounding counties also have a high concentration of Hispanic: Valencia, 56 percent; Torrance, 52.6 percent; and Sierra, 35.8 percent (U. S. Bureau of Census, 1975). The ethnic breakdown of the 102 BLM permittees is 56 Anglo, 44 Hispanic, and 2 Native American (BLM Socorro District Files).

INCOME

Total direct income generated in the ES Area by operators and their families, from three industrial sectors is estimated at $3,339,927 with 75 percent attributable to the range livestock industry ($1,601,508, or 48 percent, is attributable to public land), 25 percent to the transportation and public utilities sector, and less than 1 percent to mining and other sectors (Table 2-21). Total income for Socorro County is estimated at $29,872,000. Total indirect income of the area is estimated at $9,226,515 with range livestock accounting for 86 percent. Livestock on public lands accounts for $5,082,866 or 55 percent (Table 2-21).

Non-farm family income of all ES Area BLM operators was an estimated $686,629 in 1977, with income from off-farm employment in transportation, construction, and utilities accounting for over 33 percent of this total (Table 2-22). Over half of the non-farm income was received by operators of subsistence-type enterprises. In 1973 annual cash receipts (income) from all livestock grazing varied from an average of $489 per operator in the subsistence small ranch category to $98,656 per operator in the large ranch category. For all operators the total income was $2,507,057; total costs were $1,483,996; and total net returns were $1,068,884 (Appendix 6, Table A-26, p. A-92).

EMPLOYMENT

Total employment for the impact area (Map 2-6) is estimated at 7,000. There are 76 individuals (both farm and non-farm workers) in the ES Area who are covered by unemployment compensation and social security. Range livestock accounts for 47, transportation and public utilities 16, mining 12, and other 1. Employment in the transportation and public utilities sector consists primarily of part-time jobs such as school bus driving. The operators and their families directly working on the ranch are not included in the above employment figures. It is estimated that of the total ranch labor, operators and their families provide 63 percent; full-time hired labor, 13 percent; seasonal monthly hired labor, 22 percent; and hired day labor, 2 percent. Illegal aliens are often used as occasional ranch labor (Southwest Research and Development Company, 1977). Table 2-23 shows average estimates of employment, wage rates, and labor costs in the ES Area livestock sector.

Off-farm employment of ranch families (ranch operators and spouses) totaled 83 positions. They were in such areas as trade, public services, transportation, construction, and utilities and private services; the latter was the most common (Table 2-22).

The average annual unemployment rates for the counties that are part of, or adjacent to, the ES Area are: Sierra, 6.3 percent; Socorro, 8.1 percent; Torrance, 8.8 percent; and Valencia, 7.5 percent. The average annual unemployment rate for New Mexico is 7.8 percent (Personal Communication, New Mexico Employment Security Commission, 1978).

TABLE 2-20

LAND OWNERSHIP, 1975-77

Ownership	Sierra	Socorro	Torrance	Valencia	ES Area	Percent of Total
	COUNTIES					
	Acres					
Bureau of Land Management	14,320	715,838	760	107,890	838,808	50.8
Bureau of Reclamation	6,618	16,434	0	0	23,052	1.4
Private	1,760	333,994	11,738	147,704	495,196*	30.0
State	1,145	244,329	11,852	35,832	293,158*	17.8
Total	23,843	1,310,595	24,350	291,426	1,650,214*	100.0

* Includes land in non-AMP allotments

Source: BLM Socorro District Office

TABLE 2-21

INCOME BY INDUSTRIAL SECTOR BY OPERATORS and THEIR FAMILIES

Sector	Direct Income (Dollars)	% of Direct Income	Indirect Income (Dollars)	% of Indirect Income
Transportation and Public Utilities	821,600	25	1,242,670	13
Agriculture				
Range livestock	2,507,057*	75	7,956,898*	86
Public land livestock	(1,601,508)*	(48)	(5,082,866)*	(55)
Other	6,450	0	13,389	0
Mining	4,820	0	13,558	0
Total	3,339,927	100	9,226,515	99**

* Denotes 1975 Dollars
** Percent does not add to 100 because of rounding error.

Source: Southwest Research and Development Co. and BLM Socorro District Files

TABLE 2-22

ESTIMATED NON-FARM JOBS AND NON-FARM INCOME OF RANCH FAMILIES BY SIZES OF RANCHES, 1975

	Average Rate	Subsistence Ranches		Small Ranches		Medium-size Ranches		Large Ranches		All Ranches	
Economic Sector	Dollars	Dollars	Numbers	Dollars	Numbers	Dollars	Numbers	Dollars	Numbers	Dollars	Numbers
Mining	---	0	0	0	0	0	0	0	0	0	0
Manufacturing	8,266	8,266	1	0	0	0	0	0	0	8,266	1
TCU 1/	13,101	104,808	8	65,505	5	26,202	2	13,101	1	209,616	16
Trade	5,819	40,733	7	64,009	11	34,914	6	0	0	139,656	24
Private Services	8,037	56,259	7	24,111	3	32,148	4	8,037	1	120,555	15
Public Services	7,236	108,540	15	21,708	3	0	0	0	0	130,248	18
Other	---	53,288	8	0	0	0	0	25,000	1	78,288	9
Total Non-Farm Income, All Sectors	---	371,894	46	175,333	22	93,264	12	46,138	3	686,629	83

1/ Transportation, construction, and utilities

Source: Southwest Research and Development Co., 1977 and BLM Socorro District Grazing Files

TABLE 2-23

ESTIMATED AVERAGE EMPLOYMENT, WAGE RATES, AND LABOR COSTS IN ONE YEAR BY RANCH SIZE, 1977

		Labor Per Ranch			
Items	Units 1/	Subsistence Ranches	Small Ranches	Medium-Size Ranches	Large Ranches
Number of Operators		49	20	20	13
Family					
Operator	Man-months	3	6	9	10
Other	Man-months	1	1	3	4
Total	Man-months	4	7	12	14
Hired					
Full-Time					
Amount	Man-months	0	0	0	12
Wage Rate	Dollars	-	-	-	380
Cost	Dollars	0	0	0	4,560
Seasonal					
Amount	Man-months	0	3	7	5
Wage Rate	Dollars	-	300	340	340
Cost	Dollars	0	900	2,380	1,700
Day					
Amount	Man-days	3	0	30	0
Wage Rate	Dollars	17.60	-	21.10	-
Cost	Dollars	53	0	633	0
Total Labor Hired	Man-months	0.1	3	8	26
Total Hired Labor Cost	Dollars	53	900	3,013	6,260

1/ One man-month equals 25 man-days of labor.

Source: Southwest Research and Development Co., 1977

ATTITUDES AND LIFESTYLES

In the ES Area ranchers and their families are probably the most dominant users and most interested in the public lands. This is because they are usually directly dependent on the grazing resource. The ranching interest group feels that it will become more difficult to earn an adequate income, particularly using public lands, because of declining range improvement programs and declining predator and rodent control programs (Southwest Research and Development Co., 1977).

A major problem in pursuing a ranching lifestlye is the availability of capital. Adequate capital is needed to obtain or expand a ranch, purchase livestock, and acquire the necessary operating equipment. There are those, however, that are content to pursue the ranching lifestyle only on weekends. This requires less capital than full-time ranching and is actually a production-consumption lifestyle of its own (Southwest Research and Development Co., 1977).

Environmental and conservation groups are probably the other dominant interest group of the public land. Their numbers within the ES Area are very limited, but they work with State and national organizations and are very vocal. Their influence is far greater than their numbers. Conservation groups feel strongly that areas should be preserved in their natural state in order to maintain and protect wildlife and their habitats, aesthetic values, scenic quality, and recreation potential. This group supports the designation of wilderness and wildlife areas as a means to preserve wildlife and their habitats. They anticipate that the rate of exploitation of natural resources in the area will decline as conservation measures are adopted (Southwest Research and Development Co., 1977).

Future Environment

The 25 existing AMP allotments would be intensively managed while the remaining allotments would continue as they are, without AMPs or livestock reductions in the ES Area. No jobs would be lost; income would increase 0.5 percent to $2,532,589; permit values would increase 0.6 percent to $18,137,700. Tables 2-24, 2-25, 2-26 and Figures A-11 through A-16 (Appendix 6, pp. A-89-91) compare the Future Environment to the Proposed Action and alternatives. The ES Area's population is expected to remain relatively unchanged (Southwest Research and Development Co., 1977).

Impacts

INTRODUCTION

In the socio-economic section additional acreage and AUMs were included in the analysis. These additional acres (1,650,214 versus 1,318,147 acres in other resource sections) and AUMs (189,646 versus 119,465 in other resource sections) are attributed to the private and State land on the non-AMP allotments. The Proposed Action and alternatives would not have impacts on these acres and AUMs. However, it was necessary to include these additional acres and AUMs to arrive at a more valid total direct income in the entire ES Area. This allowed a more thorough analysis of impacts to the livestock operators and related services under the Proposed Action and alternatives; therefore, with the additional acres and AUMs, this section shows a 21-percent reduction in livestock AUMs in the Proposed Action rather than the 30-percent reduction in AUMs analyzed in all other resource sections of the ES. The adjustments in grazing use would be the same for each allotment but the overall average decrease from a 30-percent reduction to a 21-percent reduction would be because of the addition of acreage and AUMs where no change was proposed.

POPULATION AND EMPLOYMENT

Total population and employment would be only slightly affected because of the sparsely populated ES impact area. Ranch family population would not change in the short term. For each 2-percent reduction in grazing one job would be lost in the impact area. Consequently, as grazing use is reduced, unemployment would increase; on the other hand, as grazing use is increased, employment would increase (Southwest Research and Development Co., 1977). Jobs gained as a result of increased grazing use would probably not be the same jobs that were lost as a result of reductions of grazing use.

Proposed Action - Total employment for the impact area (Map 2-6) is at 7,000. The 21-percent reduction in grazing use would result in the loss of 10 jobs (1.4 percent) in the short term. In the long term grazing use would be approximately 2 percent above the existing situation. The same number of jobs that were lost during the short term would be regained and one new job would be created in the long term.

No Action Alternative - The 5-percent reduction in grazing use would eliminate approximately 2 jobs (less than 1 percent) in the short term, but an equal number of jobs would be regained in the long term.

Livestock Adjustment Alternative - The 21-percent reduction in grazing use would result in the loss of 10 jobs in the short term. In the long term grazing use would be approximately 2 percent below the existing situation. All but one job lost during the short term would be regained in the long term.

TABLE 2-24

DIRECT AND INDIRECT INCOME FROM THE RANGE LIVESTOCK INDUSTRY /1

	EE	PA		NA/FE		LA		PCL		ESR		NG
	Short and Long Term /2	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short & Long Term
Direct Income /3												
Cash Receipts from all grazing	2,507,057	1,979,537	2,552,837	2,399,368	2,532,589	1,979,537	2,467,854	1,689,481	2,613,109	1,549,126	2,758,084	1,332,536
Cash Receipts from public land grazing	1,601,508	1,255,224	1,618,753	1,525,998	1,643,802	1,255,224	1,564,866	509,475	826,265	345,765	1,811,509	0
Indirect Income /3												
Cash Receipts from all grazing	7,956,889	6,282,655	8,076,175	7,615,114	8,037,931	6,282,655	7,832,475	5,362,075	8,293,185	4,916,616	8,753,607	4,229,203
Cash Receipts from public land grazing	5,082,866	3,983,830	5,137,598	4,843,215	5,217,099	3,983,830	4,966,571	1,616,972	2,622,400	1,097,389	5,749,367	0

EE - Existing Environment
PA - Proposed Action
NA/FE - No Action Alternative and Future Environment
LA - Livestock Adjustment Alternative

PCL - Pasture Capacity Level Alternative
ESR - Enhancement of Sensitive Resource Values Alternative
NG - No Grazing Alternative

/1 Summary of Tables A-26 to A-37, in Appendix 6, pp. A-92-103, shows Estimated Receipts, Cost, and Net Returns per Ranch Size Categories for the Existing Environment and Short and Long Term for the Proposed Action and Alternatives.

/2 Existing Environment is for 1977

/3 Denotes 1975 Dollars

Source: BLM Socorro District Grazing Files and Southwest Research and Development Co., 1977

TABLE 2-25

PERMIT VALUE BY RANCH SIZE CATEGORY
(In Thousands of Dollars)

	EE	PA		NA/FE		LA		PCL		ESR		NG
		Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short & Long Term
SS	315.9	339.3	378.0	374.4	339.3	339.3	364.5	367.2	257.4	270.0	234.0	342.0
SL	1,069.2	703.8	688.5	872.1	889.2	703.8	661.5	719.1	810.0	792.0	900.0	745.2
SCS	548.1	688.5	541.8	469.8	655.2	688.5	633.6	655.2	662.4	783.0	669.6	560.7
SCM	616.5	1,109.7	793.8	1,029.6	603.0	1,109.7	1,012.5	1,012.5	691.2	675.0	729.0	232.2
SCL	1,317.6	1,083.6	934.2	1,140.3	1,310.4	1,083.6	805.5	796.5	756.0	486.0	765.0	347.4
MCS	3,053.7	1,593.9	2,971.8	2,286.0	2,732.4	1,593.9	3,006.9	1,125.0	3,715.2	1,431.0	3,313.8	1,344.6
MCL	2,513.7	3,337.2	3,337.2	2,608.2	2,880.0	3,337.2	3,410.1	3,880.8	3,016.8	3,102.3	3,654.0	3,361.5
L	8,646.3	5,370.3	8,716.5	8,505.9	8,728.2	5,370.3	7,916.4	3,969.0	10,948.5	3,868.2	11,002.5	3,019.5
Total Grazing	18,081.0	14,226.3	18,361.8	17,286.3	18,137.7	14,226.3	17,811.0	12,525.3	20,857.5	11,407.5	21,267.9	9,953.1

Note: Permit value is based on $900 per AU.

EE - Existing Environment
NA/FE - No Action Alternative and Future Environment
PCL - Pasture Capacity Level Alternative
NG - No Grazing Alternative

PA - Proposed Action
LA - Livestock Adjustment Alternative
ESR - Enhancement of Sensitive Resource Values Alternative

SS = Subsistence Small
SCS = Small Commercial Small
SCL = Small Commercial Large
MCL = Medium Commercial Large

SL = Subsistence Large
SCM = Small Commercial Medium
MCS = Medium Commercial Small
L = Large

Source: BLM Socorro District Grazing Files and Federal Land Bank, Albuquerque

TABLE 2-26

OPERATORS BY RANCH SIZE CATEGORY IN THE SHORT AND LONG TERMS

	Characteristics in EE		Characteristics in ST		Change From EE to ST		Characteristics in LT		Change From EE to LT	
	No. of Operators	Average No./AUs	No. of Operators	Average No./AUs	No. of Operators	Average No./AUs	No. of Operators	Average No./AUs	No. of Operators	Average No./AUs
Proposed Action										
Subsistence Small	27	13	29	13	+2	0	27	15	0	+2
Subsistence Large	22	54	17	46	-5	-8	15	51	-7	-3
Small Commercial Small	7	87	9	85	+2	-2	8	89	+1	+2
Small Commercial Medium	5	137	9	137	+4	0	7	126	+2	-11
Small Commercial Large	8	183	7	172	-1	-11	6	173	-2	-10
Medium Commercial Small	13	261	7	253	-6	-8	13	254	0	-7
Medium Commercial Large	7	399	9	412	+2	+13	9	412	+2	+13
Large	13	739	9	663	-4	-76	13	748	0	+9
Total	102		96				98			
No Action Alternative/ Future Environment										
Subsistence Small	27	13	32	13	+5	0	29	13	+2	0
Subsistence Large	22	54	19	51	-3	-3	19	52	-3	-2
Small Commercial Small	7	87	6	87	-1	0	8	91	+1	+4
Small Commercial Medium	5	137	8	143	+3	+6	5	134	0	-3
Small Commercial Large	8	183	7	181	-1	-2	8	182	0	-1
Medium Commercial Small	13	261	10	254	-3	-7	12	253	-1	-8
Medium Commercial Large	7	399	7	414	0	+15	8	400	+1	+1
Large	13	739	13	727	0	-12	13	746	0	+7
Total	102		102				102			
Livestock Adjustments Alternative										
Subsistence Small	27	13	29	13	+2	0	27	15	0	+2
Subsistence Large	22	54	17	46	-5	-8	15	49	-7	-5
Small Commercial Small	7	87	9	85	+2	-2	8	88	+1	+1
Small Commercial Medium	5	137	9	137	+4	0	9	125	+4	-12
Small Commercial Large	8	183	7	172	-1	-11	5	179	-3	-4
Medium Commercial Small	13	261	7	253	-6	-8	13	257	0	-4
Medium Commercial Large	7	399	9	412	+2	+13	9	421	+2	+22
Large	13	739	9	663	-4	-76	12	733	0	-6
Total	102		96				98			
Pasture Capacity Level Alternative										
Subsistence Small	27	13	34	12	+7	-1	22	13	-5	0
Subsistence Large	22	54	17	47	-5	-7	18	50	-4	-4
Small Commercial Small	7	87	8	91	+1	+4	8	92	+1	+5
Small Commercial Medium	5	137	9	125	+4	-12	6	128	+1	-9
Small Commercial Large	8	183	5	177	-3	-6	5	168	-3	-15
Medium Commercial Small	13	261	5	250	-8	-11	16	258	+3	-3
Medium Commercial Large	7	399	11	392	+4	-7	8	419	-1	+20
Large	13	739	7	630	-6	-109	15	811	+2	+72
Total	102		96				98			
Enhancement of Sensitive Resource Values Alternative										
Subsistence Small	27	13	30	10	+3	-3	20	13	-7	0
Subsistence Large	22	54	20	44	-2	-10	20	50	-2	-4
Small Commercial Small	7	87	10	87	+3	0	8	93	+1	+6
Small Commercial Medium	5	137	6	125	+1	-12	6	135	+1	-2
Small Commercial Large	8	183	3	180	-5	-3	5	170	-3	-13
Medium Commercial Small	13	261	6	265	-7	+4	14	263	+1	+2
Medium Commercial Large	7	399	9	383	+2	-16	10	406	+3	+7
Large	13	739	7	614	-6	-125	15	815	+2	+76
Total	102		91				98			
No Grazing Alternative										
Subsistence Small	27	13	38	10	+11	-3	38	10	+11	-3
Subsistence Large	22	54	18	46	-4	-8	18	46	-4	-8
Small Commercial Small	7	87	7	89	0	+2	7	89	0	+2
Small Commercial Medium	5	137	2	129	-3	-8	2	129	-3	-8
Small Commercial Large	8	183	2	193	-6	+10	2	193	-6	+10
Medium Commercial Small	13	261	6	249	-7	-12	6	249	-7	-12
Medium Commercial Large	7	399	9	415	+2	+16	9	415	+2	+16
Large	13	739	5	671	-8	-68	5	671	-8	-68
Total	102		87				87			

EE = Existing Environment
ST = Short Term
LT = Long Term

Source: BLM Socorro District Grazing Files

Pasture Capacity Level Alternative - The 31-percent reduction in grazing use would result in the loss of 15 jobs (2 percent) in the short term. The long-term, 15-percent increase in grazing use above the existing situation would restore the lost jobs and create 7 (1 percent) new jobs. These would not be the same jobs that were lost during the reduction period.

Enhancement of Sensitive Resource Values Alternative - The 37-percent reduction in grazing use would result in the loss of 18 jobs (2.5 percent) in the short term. The long-term, 18-percent increase in grazing use above the existing situation would restore the lost jobs and would create 9 (1.2 percent) new jobs. These would not be the same jobs that were lost during the reduction period.

No Grazing Alternative - Twenty-two (3.1 percent) jobs would be lost in the short term and not reinstated in the long term because of the 45-percent reduction in grazing use. This would result from the elimination of grazing on public land.

INCOME

Large economic gains would not be possible from the ES Area grazing resource. Long-term increases in direct livestock income would be attributable to increased grazing use because of increased forage production. Table 2-27 shows direct income by ranch size categories.

Indirect income from livestock for the short and long terms in the impacted economy would fluctuate in conjunction with the direct income (Table 2-24); this is caused by changes in grazing use (Appendix 5, Table A-24, p. A-83).

Because operators of smaller ranches are less dependent on income derived from ranching (Table A-26), as compared to non-ranching income (Table 2-22) they would be less effected by a reduction in grazing use than the operators of larger ranches. For example, an operator of a small ranch may receive only 10 percent of his total income from his ranch. If his reduction is 50 percent, it would decrease his total income about 5 percent. On the other hand, an operator of a larger ranch who earns 90 percent of his total income from ranching, receiving a 50-percent reduction, would have his total income reduced about 45 percent.

During the first two years of implementation operators would continue functioning as they presently are. Management practices would not change until all reductions have been made. Livestock production rates and variable costs during this period would probably remain constant and reflect rates typical of a particular ranch size. Further, none of the operators would suspend operations until the target level of reduction would be reached. During this period ranch operators would reduce their livestock to the adjustment level.

Proposed Action - Total income for Socorro County is estimated at $29,872,000 with range livestock from all grazing accounting for $2,507,057 or 8.3 percent. In the short term the range livestock industry's contribution would be $1,979,537 or 6 percent. In the long term the industry's contribution would be $2,552,837 or 8.5 percent (See Map 2-6 for the boundary of the impact area).

No Action Alternative - In the short term the range livestock industry's contribution to the local economy from all grazing would be $2,399,368 or 8 percent. In the long term the industry's contribution would be $2,532,589 or 8.4 percent.

Livestock Adjustment Alternative - In the short term the range livestock industry's contribution to the local economy from all grazing would be $1,979,537 or 6.6 percent. In the long term the industry's contribution would be $2,467,854 or 7.3 percent.

Pasture Capacity Level Alternative - In the short term the range livestock industry's contribution to the local economy from all grazing would be $1,689,481 or 5 percent. In the long term the industry's contribution would be $2,613,109 or 7.8 percent.

Enhancement of Sensitive Resource Values Alternative - In the short term the range livestock industry's contribution to the local economy from all grazing would be $1,549,126 or 4.6 percent. In the long term the industry's contribution would be $2,758,084 or 9.2 percent.

No Grazing Alternative - The range livestock industry's contribution would be $1,332,536 or 4.4 percent in both the short and long terms.

PERMIT VALUE

As a result of the proposed livestock reductions, grazing permit values associated with public lands would decline. Reductions in current grazing permit values would cause a reduction in ranchers' equities, e.g., loan collateral and sale value. This would result in increased difficulty in obtaining real estate and intermediate term loans. Also, lenders would be more reluctant to make range development loans with a third party having an influence on the number, size, and location of range developments (Southwest Research and Development Co., 1977). As a result, some ranch operators would drop out of the livestock industry. Presently, the grazing permit value of an AU on public land averages $900 for yearlong grazing (BLM communication with James C. Harrelson,

TABLE 2-27

SUMMARY OF INCOME (DOLLARS) BY RANCH SIZE CATEGORY

	Subsistence Small	Subsistence Large	Small Commercial Small	Small Commercial Medium	Small Commercial Large	Medium Commercial Small	Medium Commercial Large	Large	Total
Existing Environment									
Number of Operators	27	22	7	5	8	13	7	13	102
Average Income	489	4,650	9,283	15,650	21,001	33,176	52,357	98,656	
Total Income	13,203	102,300	64,981	78,250	168,008	431,288	366,499	1,282,528	2,507,057
Proposed Action									
Short Term									
Number of Operators	29	17	9	9	7	7	9	9	96
Average Income	651	3,106	11,974	16,080	20,690	31,528	54,895	88,421	
Total Income	18,879	52,802	107,766	144,720	144,830	220,696	494,055	795,789	1,979,537
Long Term									
Number of Operators	27	15	8	7	6	13	9	13	98
Average Income	749	5,400	9,241	12,932	11,446	32,916	55,228	99,502	
Total Income	20,223	81,000	73,928	90,524	68,676	427,908	497,052	1,293,526	2,552,837
No Action Alternative and Future Environment									
Short Term									
Number of Operators	32	19	6	8	7	10	7	13	102
Average Income	752	4,018	8,893	17,225	21,445	31,586	54,263	97,076	
Total Income	24,064	76,342	53,358	137,800	150,115	315,860	379,841	1,261,988	2,399,368
Long Term									
Number of Operators	29	19	8	5	8	12	8	13	102
Average Income	651	3,978	11,610	15,342	21,358	32,359	51,980	99,502	
Total Income	18,879	75,582	92,880	76,710	170,864	388,308	415,840	1,293,526	2,532,589
Livestock Adjustment Alternative									
Short Term									
Number of Operators	29	17	9	9	7	7	9	9	96
Average Income	651	3,106	11,974	16,080	20,690	31,528	54,895	88,421	
Total Income	18,879	52,802	107,766	144,720	144,830	220,696	494,055	795,789	1,979,537
Long Term									
Number of Operators	27	15	8	9	5	13	9	12	98
Average Income	746	5,485	8,856	13,983	26,311	33,706	54,901	92,075	
Total Income	20,142	82,275	70,848	125,847	131,555	438,178	494,109	1,104,900	2,467,854
Pasture Capacity Level Alternative									
Short Term									
Number of Operators	34	17	8	9	5	5	11	7	96
Average Income	753	3,187	9,476	14,157	19,787	30,462	52,534	82,480	
Total Income	25,602	54,179	75,808	127,413	98,935	152,310	577,874	577,360	1,689,481
Long Term									
Number of Operators	22	18	8	6	5	16	8	15	98
Average Income	990	3,977	8,690	14,825	18,955	28,553	54,220	91,726	
Total Income	21,780	71,586	69,520	88,950	94,775	456,848	433,760	1,375,890	2,613,109

TABLE 2-27 (continued)

SUMMARY OF INCOME (DOLLARS) BY RANCH SIZE CATEGORY

	Subsistence Small	Subsistence Large	Small Commercial Small	Small Commercial Medium	Small Commercial Large	Medium Commercial Small	Medium Commercial Large	Large	Total
Enhancement of Sensitive Resource Values Alternative									
Short Term									
Number of Operators	30	20	10	6	3	6	9	7	91
Average Income	378	2,983	9,092	14,589	20,819	33,764	51,994	80,955	
Total Income	11,340	59,660	90,920	87,534	62,457	202,584	467,946	566,685	1,549,126
Long Term									
Number of Operators	20	20	8	6	5	14	10	15	98
Average Income	702	4,075	9,869	15,681	19,362	33,904	53,669	92,090	
Total Income	14,040	81,500	78,952	94,086	96,810	474,656	536,690	1,381,350	2,758,084
No Grazing Alternative									
Short and Long Term									
Number of Operators	38	18	7	2	2	6	9	5	87
Average Income	637	3,128	9,241	14,534	21,852	30,374	55,212	87,083	
Total Income	24,206	56,304	64,687	29,068	43,704	182,244	496,908	435,415	1,332,536

Source: Summary of Table 2-39 and Tables A-26-37 (Appendix 6, pp. A-92-103)

President, Federal Land Bank Association of Albuquerque).

Proposed Action - Grazing permit values after the 21-percent decrease in grazing use in the short term is estimated at $14,226,300. This would be a $3,854,700 (21 percent) decrease from the existing situation. The long-term, 29-percent increase in permit values from the short term would be $18,361,800. This would be a 2-percent increase in permit values from the existing situation.

No Action Alternative - Grazing permit values after the 5-percent decrease in grazing use in the short term are estimated at $17,286,300. This would be a $794,700 (5 percent) decrease from the existing situation. The long-term, 6-percent increase in permit values from the short term would be $18,137,700. This would be a 0.6-percent increase in permit values from the existing situation.

Livestock Adjustment Alternative - Grazing permit values after the 21-percent decrease in grazing use in the short term are estimated at $14,226,300. This would be a $3,854,700 (21 percent) decrease from the existing situation. The long-term, 25-percent increase in permit values from the short term would be $17,811,000. This would be a 2-percent decrease in permit values from the existing situation.

Pasture Capacity Level Alternative - Grazing permit values after the 31-percent decrease in grazing use in the short term are estimated at $12,525,300. This would be a $5,555,700 (31 percent) decrease from the existing situation. The long-term, 66-percent increase in permit values from the short term would be $20,857,500. This would be a 15-percent increase in permit values from the existing situation.

Enhancement of Sensitive Resource Values Alternative - Grazing permit values after the 37-percent decrease in grazing use in the short term are estimated at $11,407,500. This would be a $6,673,500 (37 percent) decrease from the existing situation. The long-term, 86-percent increase in permit values from the short term, would be $21,267,900. This would be an 18-percent increase in permit values from the existing situation.

No Grazing Alternative - Grazing permit values would decrease 45 percent after grazing is eliminated on public land in the short and long term. Estimated permit values would be $9,953,100. This would be an $8,127,900 (45 percent) decrease from the existing situation.

NUMBER OF OPERATORS AND RANCH SIZES

As a result of the reduction in grazing use under the different alternatives there would be decreases in the total number of operators in the short term. Four 100-percent public land allotments (286, 302, 311, and 357) would have their proposed grazing preference set at 0 AUMs, except in the No Action Alternative. Ranch numbers and sizes for each alternative are shown in Table 2-26. Proposed changes in grazing use by operator are shown on Table A-24 (Appendix 5, p. A-83). Also, changes in ranch categories are depicted in Figures A-11 through A-16 (Appendix 6, pp. A-89-91).

Proposed Action - Changes in operator numbers and ranch sizes are shown in Table 2-26. In the short term 6 subsistence small operators, which are 100-percent dependent on public land for grazing, would be reduced to 0 AUMs. Four would have grazing permanently eliminated, while 2 would have a short-term grazing use of 0 AUMs and may reenter the livestock industry in the long term as vegetative conditions improve. In the short term several operators would move to smaller ranch size categories while in the long term there would be a shift to larger ranch sizes (Figure A-11, Appendix 6, p. A-89).

No Action Alternative - Changes in operator numbers and ranch sizes are shown in Table 2-26. In the short term several existing AMP operators would move to small ranch size categories while in the long term there would be a shift to larger ranch sizes. The operators on the 96 non-AMP allotments would not change numbers or ranch size in the short or long term (Figure A-12, Appendix 6, p. A-89).

Livestock Adjustment Alternative - Changes in operator numbers and ranch sizes are shown in Table 2-26. In the short term 6 subsistence small operators, 100-percent dependent on public land for grazing, would be reduced to 0 AUMs. Four would have their grazing permanently eliminated, while 2 would have a short-term grazing use of 0 AUMs and would reenter the livestock industry in the long term as vegetative conditions improve. In the short term several operators would move to smaller ranch size categories, while in the long term there would be a shift to larger ranch sizes (Figure A-13, Appendix 6, p. A-90).

Pasture Capacity Level Alternative - Changes in operator numbers and ranch sizes are shown in Table 2-26. In the short term 6 subsistence small ranches, 100-percent dependent on public land for grazing, would be reduced to 0 AUMs. Four would have their grazing permanently eliminated, and 2 would have a short-term grazing use of 0 AUMs and would reenter the livestock industry in the long term as vegetative conditions improve. In the short term several ranches would move to smaller ranch size categories, while in the long term there would be a shift to larger ranch sizes (Figure A-14, Appendix 6, p. A-90).

Enhancement of Sensitive Resource Values Alternative - Changes in operator numbers and ranch sizes are shown in Table 2-26. In the short term 11 ranches would be reduced to 0 AUMs. Four subsistence ranches would be permanently eliminated, and 7 ranches would have a short-term grazing use of 0 AUMs and would reenter the livestock industry in the long term as vegetative conditions improve. In the short term several ranches would move to smaller ranch size categories, while in the long term there would be a shift to larger ranch sizes (Figure A-15, Appendix 6, p. A-91).

No Grazing Alternative - Changes in operator numbers and ranch sizes are shown in Table 2-26. In the short and long terms fifteen (mainly subsistence small) operators would be permanently eliminated. Many operators would move to smaller ranch size categories in the short and long terms because of their dependency on public land grazing capacity (Figure A-16, Appendix 6, p. A-91).

LIFESTYLES

Changes in lifestyles would occur as a result of changes in family income. Ranch families would be slow in adjusting to basic changes in income levels. They would attempt to earn a living or partial living from ranching; supplemental income would come from off-ranch opportunities. Lifestyles would probably not change drastically for those families with substantial off-ranch income opportunities.

Most of the larger ranchers have been earning the majority of their family incomes from ranching and would probably suffer the greatest impact in changes in lifestyles. Many of these individuals may not have the training and skills needed to move into the off-ranch labor markets. Many of these individuals have been self-employed all of their lives.

Reduced incomes would cause major changes in the standard of living for ranch families. It is anticipated that household expenditures for new equipment, new homes, home repair, and allocations of income for entertainment, travel, and both indoor and outdoor recreation would decline. Reduced cash for ranch operations would mean reductions in labor expenditures; therefore, families would perform more of the tasks associated with ranching, hiring less labor, and contracting for fewer services. In an effort to reduce food expenditures, secondary livestock enterprises for home consumption (dairy cattle, poultry, and swine) may become more popular. A renewed interest in vegetable gardening would probably occur as ranch families attempt to compensate for reduced ranch income (Southwest Research and Development Co., 1977).

There would be some increase in welfare services as unemployed ranch families, who previously may have qualified but declined participation, are forced into food stamp, health care, and income supplementing phases of the programs. Hired labor, upon release, would apply for workmen's compensation benefits.

A number of operators may be forced to lease to neighboring ranch operators. There would be an increase in hobby ranching as wealthy individuals purchase ranches in the impact area. Some of the ranchers, with uneconomical size units resulting from reductions, would probably have to seek opportunities to relocate their ranching operations (Southwest Research and Development Co., 1977). Impacts on lifestyles cannot be quantified. A qualitative assessment of changes in lifestyles would be related to changes in income. As income declines, the quality of the ranching lifestyle declines.

Proposed Action - As the short-term income declines 21 percent, the quality of the ranching lifestyle declines. In the long term, as income increases 29 percent from short to long term, the quality of the ranching lifestyle improves.

No Action Alternative - Only 29 operators included in the 25 existing AMP allotments would be affected. In the short term their income declines 36 percent, and their quality of ranching lifestyle also declines. In the long term, as their income increases 64 percent from short to long term, the quality of the ranching lifestyle would increase for the 29 operators.

Livestock Adjustment Alternative - As the short-term income decreases 21 percent, the quality of ranching lifestyle declines. In the long term, as income increases 25 percent from short to long term, the quality of the ranching lifestyle improves but stabilizes at a level slightly lower than under the existing situation.

Pasture Capacity Level Alternative - As the short-term income decreases 33 percent, the quality of the ranching lifestyle declines. In the long term, as income increases 55 percent from short to long term, the quality of the ranching lifestyle improves.

Enhancement of Sensitive Resource Values Alternative - As the short-term income decreases 38 percent, the quality of the ranching lifestyle declines. In the long term, as income increases 78 percent from short to long term, the quality of the ranching lifestyle improves.

No Grazing Alternative - Both the short- and long-term income decreases of 47 percent would decrease the quality of the ranching lifestyle.

ATTITUDES

The attitudes of the rancher, his family, and the people in the local communities are expected to undergo changes. AMPs involve written agreements between BLM permittees and BLM on management strategies for range livestock enterprises that include public lands. Many operators and ranch and farm organizations view AMPs as an expansion of governmental control over the management functions of operators in using private and State as well as public land. At present 25 AMPs which affect 29 operators have been implemented. The majority of these operators are in the subsistence small through the small commercial large ranch size categories. Some operators have indicated that they would go to court to fight implementation of AMPs (Southwest Research and Development Co., 1977).

A change in grazing use would result in a change in direct income and permit value. If direct income decreases, the quality of the ranching lifestyle declines; and as permit value decreases, the resale value of a ranch decreases. Both would lead to a negative attitude change by the operator toward BLM.

Increased difficulty in intergenerational transfer of ranch properties would occur as the attraction to ranching is lost (independence in decision making) and attitudes change. Several ranchers mentioned this difficulty as a major concern in interviews conducted by Southwest Research and Development Co., 1977. Heirs have indicated declining interest in ranching if AMPs are implemented.

Deteriorating relations between members of the ranching industry and BLM are expected. Operators contacting their elected governmental officials and questioning the necessity and legality of the implementation of AMPs, as well as the competency of BLM and its range management methods on public land, would be indicators of deteriorating relationships. The threat, or actual filing, of legal actions would be another indication of deteriorating relationships.

Conservationists (members of various environmental organizations as well as their sympathizers) are another group which might undergo a change of attitude, although for the better. While not being happy about the economic plight of the operators, the conservationists feel that intensive management would improve the overall character of the public lands.

A qualitative assessment of attitudes can be related to the proposed grazing use (measured in percent change). In the short term, as the proposed grazing use decreases, the attitude of the operator toward BLM would deteriorate. In the long term, as the grazing use increases, some of the negative attitudes of operators would be reversed. The attitudes of those operators forced out of business is expected to remain negative. Conservationists would maintain their positive attitude toward BLM as public lands continue to improve.

Proposed Action - In the short term implementation of 54 new AMPs, the modification of 19 of the 25 existing AMPs, and the 21-percent reduction in grazing use would generate a negative attitude among the operators. The 30-percent increase from short to long term in grazing use would help to reverse the negative attitude change brought on by the short-term reduction in grazing use. Four operators, whose allotments consist totally of public land, would have their grazing use permanently eliminated. These individuals would have negative attitudes in both the short and long terms.

No Action Alternative - In the short term the modification of 19 of the 25 existing AMPs and the 5-percent reduction in grazing use would generate a negative attitude among the operators. The 6-percent increase from short to long term in grazing use would help to reverse the negative attitude change brought on by the short-term reduction in grazing use.

Livestock Adjustment Alternative - In the short term the modification of 19 of the 25 existing AMPs, but mostly the 21-percent reduction in grazing use, would generate a negative attitude among the operators. The 25-percent increase from short to long term in grazing use would help to reverse the negative attitude change brought on by the short-term reductions. Four operators, whose allotments consist totally of public land, would have their grazing use permanently eliminated. These individuals would have negative attitudes in both the short and long terms.

Pasture Capacity Level Alternative - In the short term implementation of 54 new AMPs, the modification of 19 of the 25 existing AMPs, and the 43-percent reduction in grazing use would generate a negative attitude among the operators. In the long term the 66-percent increase from short to long term in grazing use would help to reverse the negative attitude change brought on by the short-term reductions. Four operators, whose allotments consist totally of public land, would have their grazing use permanently eliminated. These individuals would have negative attitudes in both the short and long terms.

Enhancement of Sensitive Resource Values Alternative - In the short term the implementation of 54 new AMPs, the modification of 19 of the 25 existing AMPs, and the 37-percent reduction in grazing use would generate a negative attitude

among the operators. The 86-percent increase from short to long term in grazing use would help to reverse the negative attitude change brought on by the short-term reductions. Four operators, whose allotments consist totally of public land, would have their grazing use permanently eliminated. These individuals would have negative attitudes in both the short and long terms.

No Grazing Alternative - In the short and long terms the 100-percent reduction in grazing on public land would generate a negative attitude among the operators. Fifteen operators, whose allotments consist totally of public land, would have their grazing use permanently eliminated. These individuals would have negative attitudes in both the short and long terms.

CUMULATIVE IMPACTS

Proposed Action - The same number of jobs (10) lost in the short term would be regained and one new job would be created in the long term. There would be a 2-percent increase in the long term in direct income from the existing situation. There would be a 2-percent increase in the long term in permit values from the existing situation. Four operators would have their grazing use permanently eliminated. There would be a shift to larger ranch sizes from short to long term. The quality of the ranching lifestyle would increase from the short to the long term. The increase in grazing use in the long term would help to reverse the negative attitude changes brought on by the short-term reductions.

No Action Alternative - The same number of jobs (2) lost in the short term would be regained in the long term. There would be a 0.6-percent increase in the long term in direct income from the existing situation. There would be a 0.6-percent increase in the long term in permit values from the existing situation. There would be a shift to larger ranch sizes from the short to long term within the 25 existing AMPs; there would be no changes on the 96 non-AMP allotments. The quality of the ranching lifestyle would increase from short to long term for the operators on the 25 existing AMPs. The increase in grazing use in the long term on the existing AMPs would help to reverse the negative attitude change brought on by the short-term reductions.

Livestock Adjustment Alternative - The same number of jobs (10) lost during the short term would be regained in the long term. There would be 2-percent less direct income in the long term than in the existing situation. Permit values would be 2-percent less in the long term than in the existing situation. Four operators would have their grazing use permanently eliminated. There would be a shift to larger ranch sizes from the short to long term. The quality of the ranching lifestyle would improve from short to long term. There would be a reversal in the long term of some of the negative attitude changes brought on by the short-term livestock reductions.

Pasture Capacity Level Alternative - The 15 jobs lost in the short term would be regained and 7 new jobs would be created in the long term. There would be a 4-percent increase in the long term indirect income from the existing situation. Permit values would increase 15 percent in the long term over the existing situation. Four operators would have their grazing use permanently eliminated. There would be a shift to larger ranch sizes from the short to long term. There would be an improvement in the quality of the ranching lifestyle from short to long term. The increase in grazing use in the long term would help reverse the negative attitude changes brought on by the short-term reductions.

Enhancement of Sensitive Resource Values Alternative - The 18 jobs lost in the short term would be regained and 9 new jobs would be created in the long term. There would be a 10-percent increase in the long term in direct income from the existing situation. Permit values would increase 18 percent in the long term from the existing situation. Four operators would have their grazing use permanently eliminated. There would be a shift to larger ranch sizes from the short to long term. The quality of the ranching lifestyle would improve from short to long term. The increase in grazing use in the long term would help to reverse the negative attitude changes brought on by the short-term reductions.

No Grazing Alternative - Twenty-two (22) jobs would be permanently lost. There would be a 45-percent decrease in direct income from the existing situation. There would be a 45-percent decrease in permit values from the existing situation. Fifteen operators would have their grazing use permanently eliminated. Many operators would move to smaller ranch size categories. There would be a decline in the quality of the ranching lifestyle. A negative attitude would be generated among the operators.

Unavoidable Adverse Impacts

Proposed Action - There would be a loss of $527,520 of direct income in the short term. Permit value would decrease $3,854,700 in the short term. Four operators would have their grazing use permanently eliminated.

No Action Alternative - There would be a loss of $107,689 of direct income in the short term. Permit value would decrease $794,700 in the short term.

Livestock Adjustment Alternative - There would be a loss of $527,520 of direct income in the short term and $39,203 in the long term. Permit value would decrease $3,854,700 in the short term and $270,000 in the long term. Four operators would have their grazing use permanently eliminated.

Pasture Capacity Level Alternative - There would be a loss of $817,576 of direct income in the short term. Permit value would decrease $5,555,700 in the short term. Four operators would have their grazing use permanently eliminated.

Enhancement of Sensitive Resource Values Alternative - There would be a loss of $957,931 of direct income in the short term. Permit value would decrease $6,673,500 in the short term. Four operators would have their grazing use permanently eliminated.

No Grazing Alternative - There would be a loss of $1,174,521 in the short and long terms. Permit value would decrease $8,127,900 in the short and long terms. No operators would be allowed to graze on public land. Fifteen operators would have their grazing use permanently eliminated.

WILDLIFE

Existing Environment

BIG GAME

Four species of big game (mule deer, pronghorn antelope, mountain lion, and black bear) occur within the area. Mountain lion and black bear occur only occasionally and are not expected to be impacted.

Deer

The ES Area is thinly populated with deer, with most of the area having a density of 0.25 to 0.75 deer per section. One area, Ladron Mountain, has a deer density of about 2.5 deer per section. The ES Area when compared with bordering areas having a density of one to six deer per section is relatively marginal deer habitat. The deer use this habitat year-round with no well defined winter ranges. According to the New Mexico Department of Game and Fish (NMDG&F) the current deer population in 1977 in the ES Area was stable to decreasing at about 1,333 deer. The exact cause of the population status is not known. Over harvesting, poaching, predation, livestock competition, and lack of water are factors that may be affecting the deer population. The distribution and status of deer is shown on Map 2-7.

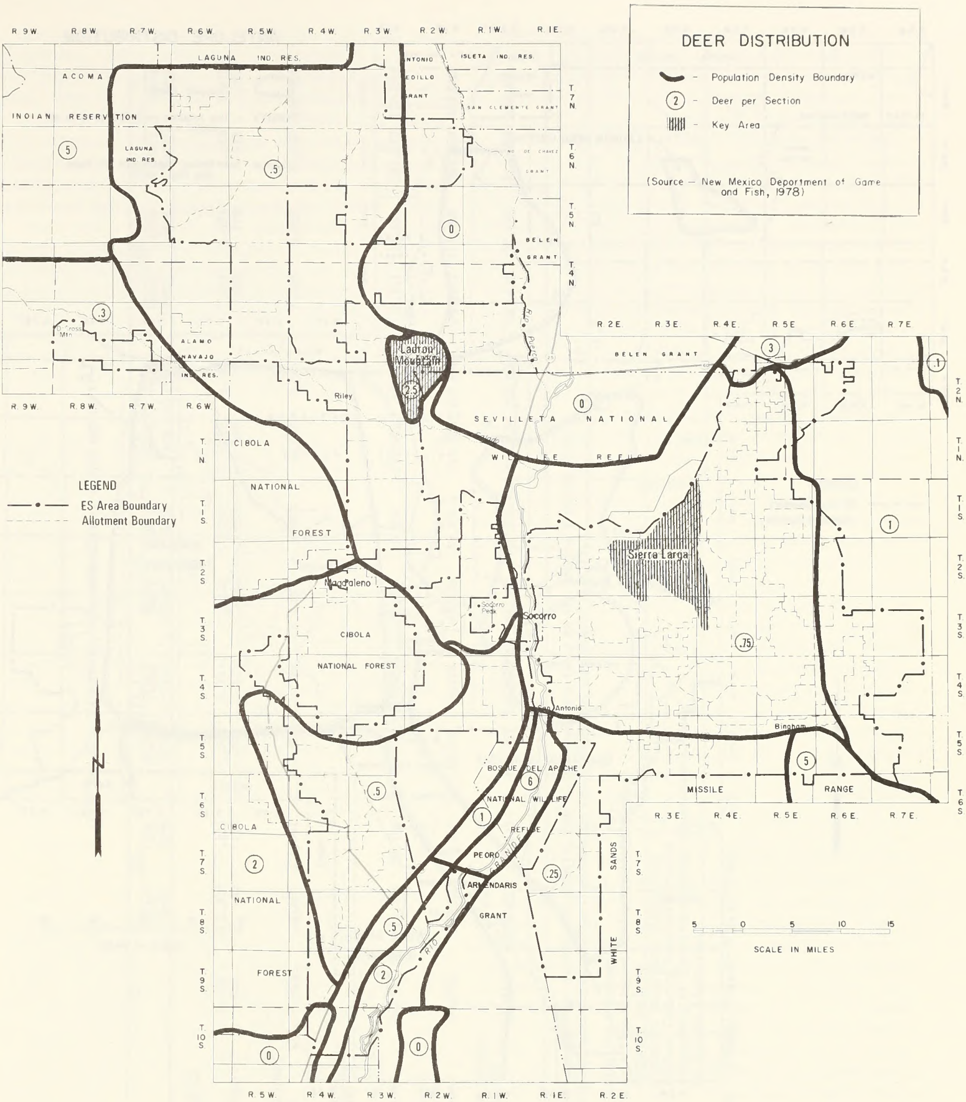
Two important areas for deer within the ES Area are Ladron Mountain (10,240 acres) and Sierra Larga (130,000 acres). Ladron Mountain has the highest deer density on public land in the ES Area. Twenty-five (25) deer pellet transects read during a study by Sutcliffe (1972) indicated the deer population on the Mountain was 2.3 plus or minus 1.3 deer per section. This figure compares to 2.7 deer per section estimated by BLM studies. Based on 2.5 deer per section, the estimated current deer population on Ladron Mountain is 40. A large portion of the Mountain is inaccesible to livestock. The forage conditions on the Mountain are good. Browse transects, read annually by BLM personnel, have shown light utilization (primarily mountain mahogany, apache-plume, rhus, and oak). The deer population on Ladron Mountain has declined from moderate to low. More research is needed to determine the reason for this decline.

Sierra Larga receives the heaviest hunting pressure and may have the largest number of deer on public land in the ES Area. NMDG&F estimates the area to have 0.75 deer per section or 150 to 160 deer total. NMDG&F estimates that the deer herd in this area has declined about 30 percent in the last 5 years. Browse transects, read annually, have shown a moderate utilization of the mountain mahogany.

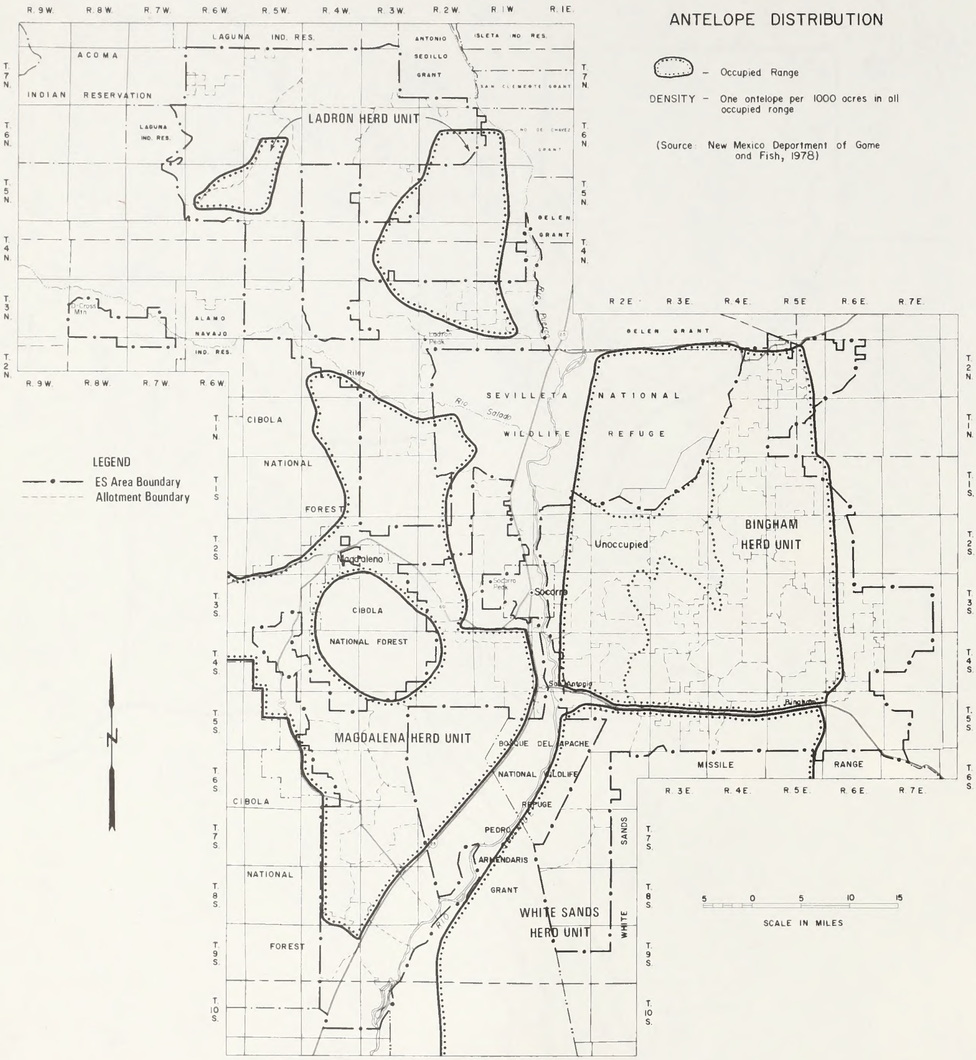
Browse (mountain mahogany, pinyon pine, juniper, rhus, and oak) make up the major portion of the deer's diet. Diet studies have shown that mountain mahogany has the highest use. The rest of their diet is made up of forbs (primarily globe mallow and bladderpod) and grasses. Although forbs do not provide a majority of the diet of deer, Urness, Green, and Watkins (1971) found them important in raising the nutrient quality of the deer's diet.

Antelope

The ES Area is included in four NMDG&F Antelope Herd Units. Two units, the Magdalena and Ladron, are completely within the ES Area. The other two units, White Sands and Bingham, have 10 and 99 percent of their area in the ES Area, respectively (Map 2-8). Using the maximum estimate of one antelope per 1,000 acres of suitable habitat, there is an estimated 648 antelope in the ES Area (Table 2-28). Their numbers have been stable over most of the area with an estimated 30-percent increase in the past 5 years only in the Magdalena Antelope Herd Unit (NMDG&F, 1977). The major increase in the Magdalena Antelope Herd Unit appears to have been in 1973 when there was unusually high precipitation. More intensive study is needed to determine what factors are limiting antelope numbers in other parts of the ES Area.



MAP 2–7. Deer Distribution



MAP 2-8. Antelope Distribution

TABLE 2-28

DEER AND ANTELOPE NUMBERS, AUMs, AND ACRES OF RESTED HABITAT

	EE	PA		NA/FE		LA		PCL		ESR		NG	
		Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term
Numbers /1													
Deer	1,333	1,333	1,333	1,333	1,333	1,333	1,333	1,333	1,333	1,333	1,333	1,333	1,333
Antelope	648	648	763	648	665	648	712	648	773	648	779	648	720
TOTAL APPORTIONED AUMs	1,903	4,802	5,041	2,362	2,394	4,802	4,893	4,802	5,057	5,018	5,287	79,237	138,914
Rested Habitat (Acres) /2													
Deer-winter rested	17,458	95,101	95,101	24,985	24,985	24,985	24,985	95,101	95,101	112,151	115,107	217,673	217,673
Antelope-spring rested	26,848	212,568	212,568	49,728	49,728	49,728	49,728	212,568	212,568	235,615	212,568	459,050	459,050
Minimum Rested at any one time	100,210	315,239	315,239	108,053	108,053	108,053	108,053	315,239	315,239	533,430	337,525	838,808	838,808

/1 Deer and antelope numbers and wildlife AUMs by allotment are filed in the Socorro District Files.
/2 Acres of habitat rested from livestock use during important periods for wildlife.

EE - Existing Evironment
NA/FE - No Action Alternative and Future Environment
PA - Proposed Action
LA - Livestock Adjustment Alternative
PCL - Pasture Capacity Level Alternative
ESR - Enhancement of Sensitive Resource Values Alternative
NG - No Grazing Aternative

Source: Proposed AMPs, Socorro District

The fawn-doe ratio can be considered an index of the antelope population status. A low fawn-doe ratio may be a result of some limiting factors such as precipitation, predation, competition, poor vegetation, and/or water. Studies concerning fetus-doe ratios among antelope indicate that a fawn-doe ratio of 200:100 can be considered the potential maximum ratio (Beale and Smith, 1970). The fawn-doe ratio surveyed in the ES Area has varied from 18:100 in 1974 to 55:100 in 1975, with an average of 43:100 (NMDG&F aerial surveys). Beale and Smith (1970) found a correlation between size of fawn crop and precipition for the 4-month period of June through September. The higher precipitation rate increased fawn survival through increased vegetative production. The increased vegetative production would provide more forage and better cover (shrubs 9- to 18-inches high) for fawns. Poor forage conditions may increase losses from predation through reduced cover.

Forbs and browse make up the majority (80 to 95 percent) of the forage consumed by antelope (Russell, 1964 and BLM Fecal Study, 1977). The remainder of the diet is made up of grasses. A diet study of antelope within the ES Area in the spring of 1977 showed a varied use of forbs and browse. Fecal samples collected from the Jornada Plains, covered by a short-grass vegetative type, showed an antelope diet of about 71.54-percent browse, 28.00-percent forbs, and 0.37-percent grass. A similar sample collected at the same time in a creosote vegetative type showed the antelope's diet of 94.69-percent forbs, 4.61-percent browse, and 0.70-percent grass. It would appear that browse and forbs are utilized in relationship to their availability. Forbs are important to antelope in both sample areas during the spring and summer. They provide a good source of nutrients to does and fawns during a critical fawning period. Forbs are also eaten to some extent in the winter.

With the exception of 30 miles of woven wire boundary fence on the Huning Ranch, existing fences in the ES Area do not appear to materially interfere with antelope movement. The Huning Ranch boundary fence is a barrier to antelope movement in the Ladron Antelope Herd Unit. This fence is on private land. Three miles of woven wire fence, south of the Huning Ranch on public land, may be a problem if antelope expand into this area.

Competition

Forage competition between livestock and deer and antelope varies by season, location, and species. This is caused by related differences in feeding habits and management practices. Direct competition between deer and livestock is normally highest during the winter when both are using mountain mahogany. Heavy grazing by livestock in areas containing winter browse reduces food availability for deer.

When forbs are available, both livestock and deer will compete for them. Competition between deer and livestock is more severe in overgrazed areas where livestock is forced to make more use of browse and forbs.

The livestock-antelope competition would appear to be greatest in spring and summer before the grasses start growing. This period is a critical time for antelope as the does need high quality food to support their young. Both livestock and antelope make extensive use of the first new growth in the spring.

SMALL MAMMALS

Lists of species of small mammals found in the ES Area are in the Ladron and Stallion Unit Resource Analyses (URAs). Each habitat type supports a diversity of species and varying populations and density of small mammals. Wood (1969) noted that the black grama climax habitat type supported a low rodent population with a mean density of 0.64 per acre. The four-wing saltbush-mesquite habitat type supported a large rodent population with a mean density of 2.63 per acre. Short-grass habitat types are preferred by jackrabbits, while cottontails prefer brushier cover. The lowest vegetative successional stages appeared to support the greatest number of small mammal species. As the successional stages approached climax, the numbers of animals and species present decreased; the species composition changed to include more insectivores and less herbivores.

BIRDS

Upland Game Birds

Scaled quail and Gambel's quail are found in the ES Area. Quail populations are subject to violent annual fluctuation and seasonal cycles (Campbell, Martin, Ferovich, and Harris, 1973). The annual quail population is variable with an estimated low of less than one bird per section in dry years to as many as 70 birds per section in extra wet years. Grasses are of relatively little value as quail food, particularly those in the grama group (*Bouteloua*). Water requirements are minimal; quail can survive long periods without drinking. Water locations, however, do have a considerable influence on quail distribution. Quail tend to concentrate around water sources in the fall and winter. Quail also require protective cover as concealment from predators, as sites for nesting, and as shelter from adverse weather. Quail require all

habitat components to be within relatively close proximity (within the same 50 acres).

Gambel's quail are found most frequently along the Rio Grande bottom lands, especially in the transition areas where the rolling hills drop off into the flat river bottoms. Away from the river Gambel's quail may be found in bottoms of arroyos where cottonwood, saltcedar, Russian olive, mesquite, and screwbean provide habitat. During moist years the Gambel's quail also use the creosote vegetative type.

Most of the area is considered to be scaled quail habitat, although the actually occupied range is limited. Scaled quail have relatively restricted habitats. Their food consists primarily of large seeds from annual and perennial forbs, such as dove weed, Russian thistle, and pigweed. Seeds from some species of brush are also eaten when available. Approximately 5 to 10 percent of their diet consists of insects, which are particularly important in providing protein for young quail.

Mourning dove are present in the ES Area year-round. They are most abundant, however, in the summer and fall. Although the species may be found on all habitat types, the highest concentrations occur near water and seed-bearing vegetation. Although the dove population or habitat has not been intensively surveyed, the ES Area appears to have fair to good habitat. Based on statewide dove populations, the area is probably used by more than 318,000 dove annually (calculated from Huey, 1967). This estimate includes individuals which only occasionally use the area or are passing through during their seasonal migration. The Bosque area along the Rio Grande is an important concentration area for dove, because it provides excellent nesting and roosting cover (USDI, BR, 1975).

Raptors

The ES Area provides a wintering area for a variety of raptors. Bald eagles and golden eagles frequently migrate or winter here. Bald eagles migrate through and winter at the Elephant Butte Marsh. Nesting golden eagles, red-tailed hawks, Swainson's hawks, and prairie falcons have been observed (BLM Socorro District files). Studies on prairie habitats have shown that raptors concentrate and nest in areas with a dense amount of rodents and other small mammals (Howard and Wolf, 1976).

Other Birds

Other birds found in the ES Area and their preferred vegetative type are listed in the Ladron and Stallion URAs. Since they are highly mobile and commonly migratory, many of the species listed are only temporary residents. Many species that have a rare occurrence in the area are not listed. The highest density of birds in the area is supported by riparian areas (Carothers, 1977). These areas, although frequently dry, provide an important source of food and cover for birds.

THREATENED OR ENDANGERED SPECIES

There are thirteen endangered species that have occurred or may occur within the ES Area. The species and their classification are listed in Table 2-29. Six of these species have or may find suitable habitat on BLM administered land.

The little blue heron and Olivaceous cormorant occur on BLM administered land at Elephant Butte Marsh. The Elephant Butte Marsh is one of the few wetlands remaining in the Rio Grande Valley. The Marsh is on BR land; 680 acres of the 800-acre Marsh is under cooperative agreement with BLM for wildlife management. The rookery of colony nesting water birds consists of Olivaceous cormorants, doublecrested cormorants, great egrets, snowy egrets, cattle egrets, and black-crowned night herons. This area is unique to the State. These birds nest in inundated willows, cottonwoods, and saltcedars (Hundertmark, 1975). They obtain most of their food from the Marsh and the nearby Elephant Butte Reservoir. BLM has a written Habitat Management Plan on the Marsh but it has not been implemented.

The bald eagle and peregrine falcon are found near water but are not restricted to the Rio Grande Valley. Two or three bald eagles frequently winter at the Elephant Butte Marsh. There are no recorded summer observations of these species in the ES Area. There is no known observation of the peregrine falcon on public land in the ES Area. The Baird's sparrow is present in the State only during migration. It nests in the north and winters in Mexico. The sparrow prefers grassland with a dense stand of grass for cover.

There are no recorded sightings of the black-footed ferret, the only endangered mammal that may occur in the ES Area. Ferrets may be found in and around prairie dog towns; there they find food and shelter. There are seven prairie dog towns that have been recorded in the ES Area. None of the prairie dog towns have been studied to determine if the black-footed ferret is present.

UNIQUE RIPARIAN AREAS

There are six perennial stream reaches, several perennial springs, and one marsh (800 acres) in the ES Area. Each of the stream reaches is less than four miles long. The Rio Salado and Mesa Carrizo are the only two streams that occur at least partly on public land. Elephant Butte Marsh is on BR land. The Marsh supports a flora and fauna which distinguishes it from any other area in New Mexico (Hundertmark, 1973). Some of these

TABLE 2-29

ENDANGERED ANIMAL SPECIES

Classification	Common Name	Scientific Name	Habitat Type	Habitat on Public Land
Federal Endangered	Black-Footed Ferret	Mustela nigripes	Prairie dog town	Yes
Federal Endangered	Whooping Crane	Grus americana	Rio Grande Valley	No
Federal Endangered	Bald Eagle	Haliaeetus leucocephalus	Large trees on cliffs near water - Elephant Butte Marsh	Yes
Federal Endangered	Peregrine Falcon	Falco peregrinus	Large cliffs near water	Yes
Federal Endangered	Socorro Isopod	Exosphaeroma thermophilum	Hot spring	No
State Endangered (Group I)	Little Blue Heron	Florida caerulea	Rio Grand Valley	Yes
State Endangered (Group II)	Olivaceous Cormorant	Phalacrocorax olivaceus	Elephant Butte Reservoir	Yes
State Endangered (Group II)	Least Tern	Sterna albifrons athalassos	Rio Grande Valley	No
State Endangered (Group II)	Mississippi Kite	Ictinia misisippiensis	Tall trees in Rio Grande Valley	No
State Endangered (Group II)	Bell's Vireo	Vireo bellii	Riparian mesquite, cottonwood willow association	No
State Endangered (Group II)	Baird's sparrow	Ammodramus bairdii	Dense grass in grassland	Yes
State Endangered (Group II)	Osprey	Pandion haliaetus carolinensis	Open water with fish	No
State Endangered (Group II)	Red-Headed Woodpecker	Melanerpes erythrocephalus	Large cottonwoods in Rio Grande Valley	No

Sources: Federal Register, Thursday, July 14, 1977, Part V; and Endangered Species Handbook for New Mexico, 1978.

fauna are endangered species (Table 2-29). The unique riparian areas within the ES Area are summarized in the Vegetation Section in Table 2-4.

AQUATIC HABITAT

The ES Area includes two riparian areas, Ponia Creek and Elephant Butte Marsh, with sufficient water quality to support fish. Ponia Creek flows from a spring down a canyon on private land for about one mile. The creek supports a small population of fathead minnows and Rio Grande chubs. The Elephant Butte Marsh, with a fluctuating water level of about 800 surface acres, supports a population of channel catfish, largemouth bass, shad, white bass and carp. The livestock utilization of vegetation around these areas varies from slight to moderate for Ponia Creek and slight to heavy for the Elephant Butte Marsh.

Future Environment

On the 25 existing AMPs the improved habitat would maintain deer numbers, while increasing antelope numbers by 17 for a total of 665 antelope. Total small mammal numbers would decrease, while cottontail rabbit numbers would increase. The change in numbers of small mammals cannot be quantified.

Wildlife habitat is not expected to change on the 96 non-AMP allotments. Deer population trends in the ES Area are unknown; therefore, future predictions are not possible. Antelope, with the exception of the Magdalena Antelope Herd Unit, would be expected to follow the stable trend of the last 5 years. The Magdalena Antelope Herd Unit would be expected to continue increasing but at a slower rate than the 30-percent increase for the last 5 years. Rodents would maintain their present high numbers.

Impacts

BIG GAME

Human activity and noise associated with construction would displace deer and antelope from the immediate area. Both deer and antelope would return to the area after construction activities were completed. This would be a short-term, local impact.

New fences would create temporary barriers to free movement. Fences, even when built to allow wildlife movement, constitute a barrier until animals learn to negotiate them. Even then, fences would serve as a barrier to rapid movement. This would be more severe for antelope than for deer because antelope usually go under or through a fence while deer usually go over. The presence of maintenance and temporary roads would provide access to areas which are presently undisturbed by human activity and would result in increased disturbance, harassment, and poaching activities. The disturbance and harassment of deer would alter use patterns. This would be a long-term, local impact.

The construction of new water developments would help provide the optimum water requirements of 2 to 3 quarts per day per hundred weight for deer and 3 quarts per day for antelope (Valentine, 1971). This would expand deer and antelope range where lack of water is a limiting factor. This would be a long-term, local impact.

The improvement in vegetative production over the existing level resulting from the livestock adjustments and grazing systems would benefit deer and antelope by increasing forage production and cover. The increased forage would provide better quality and quantity of food for deer and antelope. The increased cover would reduce predation, particularly on antelope fawns. This would be a long-term, area-wide impact.

The improved vegetation, livestock adjustments, apportionment of wildlife AUMs, and grazing systems would reduce livestock/wildlife competition. Improved vegetation would reduce competition by providing more forage for both livestock and wildlife. The livestock adjustments would reduce competition by lowering the numbers of livestock present to compete with deer and antelope. The apportionment of forage to livestock and wildlife would reduce competition by assuring sufficient forage for deer and antelope. These would be long-term, area-wide impacts.

The implementation of grazing systems would concentrate livestock in use pastures while deferring other pastures from livestock grazing. Deferred pastures would provide deer and antelope with cover and forage without competition from livestock. Because deer tend to avoid areas occupied by large concentrations of cattle (Dusek, 1975), they would shift to deferred pastures or to areas inaccessible to livestock. Scheduled winter deferment of deer habitat would remove livestock competition for browse in these pastures. Antelope doe movement is limited during their critical fawning period of 2 to 3 weeks in April and May by the relative immobility of the young. If livestock are grazed in the same pastures, it would result in reduced quality forage available to nursing does. This, in turn, would result in possible fawn mortality and malnutrition and decline in health of nursing does. Scheduled spring deferment of antelope habitat would remove livestock competition in these pastures. The competition between livestock and deer and antelope would be greatest during the initial implementation of the grazing system. The competition would decrease as wildlife learn to use deferred pastures and as forage

production increases. This would be a long-term, area-wide impact.

Increased water availability, improved quality and quantity of forage, and reduced livestock competition would allow an improvement in the habitat of deer and antelope and an increase in antelope numbers. Deer habitat, although slightly improved, would still be marginal and deer numbers are not predicted to significantly increase. The Ladron Antelope Herd Unit has been designated by the NMDG&F as being low producing. The low production of young plus marginal habitat would limit the amount of increase possible in this area.

Proposed Action - The construction disturbance on 580 acres would displace large mammals from the area for the duration of the construction activity. Three hundred and three (303) miles of maintenance and temporary roads would displace deer and antelope from the immediate area as long as the road is used. The addition of 214 miles of fence would limit deer and antelope mobility. The development of 79 troughs, 48 wildlife waters, 4 springs, and 1 earthen reservoir would increase water availability for deer and antelope.

Livestock/wildlife competition in the ES Area would be reduced through the 37-percent improved vegetation, 30-percent livestock reduction (from 170,697 to 119,465 AUMs), apportionment of 4,802 AUMs to deer and antelope, and grazing systems. A total of 4,601 AUMs would be apportioned for deer and antelope on elimination of grazing, unallotted, and AMP allotments. An additional 201 AUMs would be apportioned on non-AMP allotments. Appendix 1, Table A-1, p. A-1, shows the AUMs apportioned to deer and antelope on each allotment. This assured availability of forage would reduce competition and improve deer and antelope habitat.

Implementation of grazing systems would defer about 315,239 acres of public land (approximately 35 to 40 percent) in the ES Area at a time. This would reduce livestock/wildlife competition. Winter deferment of a minimum of 95,101 acres of deer habitat and spring deferment of a minimum of 212,568 acres of antelope habitat would further reduce competition between these species and livestock. The competition would be further reduced by the elimination of grazing on 1,987 acres, 1,612 acres of which is occupied by deer or antelope.

The increased water availability, improved quality and quantity of forage, and reduced livestock/ wildlife competition would improve deer and antelope habitat. The improved habitat would probably stabilize deer numbers at 1,333. NMDG&F does not predict an increase in deer numbers. Antelope numbers in the Magdalena, White Sands, and Bingham Antelope Herd Units are expected to increase an additional 20 percent in the long term. Improved habitat would allow for an increase in antelope numbers from 533 to about 636 antelope in the long term. The improved habitat would provide for a possible 10-percent increase in antelope numbers in the Ladron Antelope Herd Unit, from 115 to 127 antelope in the long term. There would be a total population of 763 antelope in the long term. The methodology for predicting the antelope increases is presented in Appendix 1, p. A-15.

No Action Alternative - The construction of range developments on the 25 existing AMPs would displace deer and antelope on 90 acres for the duration of the construction activity. Thirty-one (31) miles of maintenance and temporary roads would displace deer and antelope from the immediate area as long as the road is used. The addition of 14 miles of fences would limit mobility of deer and antelope. The 28 water developments would improve water availability for deer and antelope. There would be no construction of range developments on the 96 non-AMP allotments and two unallotted areas.

The 7-percent livestock adjustment, the apportionment of an additional 1,027 AUMs, and intensified management on the 25 existing AMP allotments would reduce livestock competition and provide an increase in quality and quantity of forage for deer and antelope. The grazing systems would further benefit big game through the resting of 108,053 acres at a time, with winter rest of 24,985 acres of deer habitat and spring rest of 49,728 acres of antelope habitat. Deer numbers would not be expected to increase. Antelope numbers would increase 17 for a total increase from 648 to 665 animals over the ES Area. The continuation of the present management on 96 non-AMP allotments would not change the existing deer or antelope habitat.

Livestock Adjustment Alternative - The construction of range developments on the 25 existing AMPs would displace deer and antelope on 90 acres for the duration of the construction activity. Thirty-one (31) miles of maintenance and temporary roads would displace deer and antelope from the immediate area as long as the road is used. The addition of 14 miles of fences would limit mobility of deer and antelope. The 28 water developments would improve water availability for deer and antelope. There would be no construction of range developments on the 96 non-AMP allotments and two unallotted areas.

The 30-percent improved vegetation would improve deer and antelope habitat by increasing cover and forage. The livestock/wildlife competition would be reduced through the 30-percent im-

proved vegetation, the 30-percent livestock reduction (from 170,697 to 119,465 AUMs), and apportionment of 4,802 AUMs for deer and antelope. Livestock/wildlife competition would be further reduced on 25 existing AMP allotments with the implementation of grazing systems. The resting of a minimum of 108,053 acres in the ES Area at any time, including winter deferment of 24,985 acres of deer habitat and spring deferment of 49,728 acres of antelope habitat, would reduce competition. The improved vegetation and reduced competition would improve the condition of deer habitat and increase antelope numbers. Antelope numbers in all areas except the Ladron Antelope Herd Unit would be expected to increase 60 to 70 animals in the long term for a total of 712 animals.

Pasture Capacity Level Alternative - The construction disturbance on 580 acres and the use of 303 miles of maintenance and temporary roads would displace deer and antelope from the immediate area. The construction of 214 miles of fences would limit deer and antelope movement. The development of 79 troughs, 48 wildlife waters, 4 springs, and 1 earthen reservoir would improve deer and antelope habitat by increased water availability.

The 61-percent improved vegetation would improve deer and antelope habitat by increasing cover and forage. The livestock/wildlife competition would be reduced through the improved vegetation, 43-percent livestock reduction (from 170,697 to 97,036 AUMs), and apportionment of 4,802 AUMs to deer and antelope. Livestock/wildlife competition would be further reduced due to the resting of 315,239 acres at any given time, including the winter rest of 95,101 acres of deer habitat and the spring rest of 212,568 acres of antelope habitat. Competition would be further reduced by the elimination of grazing on 1,987 acres, 1,612 acres of which is occupied by deer and antelope.

Improved wildlife habitat is not expected to affect deer numbers. Antelope numbers in all areas except the Ladron Antelope Herd Unit are expected to increase 110 to 120 additional animals in the long term. The Ladron Antelope Herd Unit is expected to increase 10 to 14 new animals. The total number of antelope is expected to be 773 animals.

Enhancement of Sensitive Resource Values Alternative - The construction disturbance on 607 acres and the use of 330 miles of maintenance and temporary roads would displace deer and antelope from the immediate area. The addition of 241 miles of fences would limit deer and antelope mobility. The development of 79 troughs, 48 wildlife waters, 4 springs, and 1 earthen reservoir would improve water availability for deer and antelope.

The 64-percent improved vegetation would improve deer and antelope habitat by increasing cover and forage. The livestock/wildlife competition would be reduced through the improved vegetation, 52-percent livestock reduction (from 170,697 to 81,901 AUMs), apportionment of 5,018 AUMs to deer and antelope, and elimination of grazing on 218,191 acres in the short term and 22,286 acres in the long term. Livestock/wildlife competition would be further reduced as a result of the implementation of grazing systems and the resting of 533,430 acres at any given time. This includes a winter rest of 95,101 acres of deer habitat and a spring rest of 235,615 acres of antelope habitat.

Reduced livestock/wildlife competition would improve deer and antelope habitat. Deer numbers are not expected to change. Antelope numbers are expected to increase 10 to 14 animals in the Ladron Antelope Herd Unit and 115 to 125 animals in the remainder of the ES Area. Antelope numbers would total 779 animals in the long term.

No Grazing Alternative - There would be no construction of range developments on the 838,808 acres of public land. Existing fences on public land would not be maintained or may be removed. This would improve the habitat by removing barriers to deer and antelope movement. The addition of 1,475 miles of fences and temporary roads would impact an estimated 1,475 acres of non-public land. Because the 1,475 miles of fences on non-public land may not be constructed to BLM fence specifications, they could seriously hinder deer and antelope movement. This barrier could reduce available habitat to deer and particularly antelope with a possible elimination of these animals in certain areas.

The removal of livestock from public land would allow the vegetation to improve which would improve deer and antelope habitat. As the vegetation approaches climax, with a corresponding decrease in forbs and browse, the deer and antelope habitat is expected to stabilize or possibly decline slightly. The removal of livestock would leave all of the 79,255 AUMs on public land available to deer and antelope and eliminate livestock/wildlife competition. Livestock/wildlife competition on private and State land would continue at the present rate or increase.

Antelope numbers on non-public land would be expected to remain stable, while the improved antelope habitat on public land would increase antelope numbers. While deer habitat would be improved, other factors limiting deer numbers would have to be changed before deer could be expected to increase. The antelope on public land

in the Ladron Antelope Herd Unit would increase about seven new animals. All other herd units would increase about 62 new animals on public land. In the long term the total number of antelope is expected to be 720.

SMALL MAMMALS

The movement of equipment and materials during construction of range developments would kill some small mammals. The removal of vegetation by construction would increase predation on the remaining animals in the area. Small mammals leaving the disturbed area would also be subject to increased predation because of unfamiliarity with the new area and increased stress. This would be a short-term, local impact.

The one-acre livestock exclosures around the additional wildlife waters and springs, while protecting the developments from livestock trampling, would provide cover and forage for small mammals. These habitat areas would be further enhanced at selected wildlife waters by allowing the water to trickle out over a 4- to 6-square foot area. These irrigated areas would provide succulent grass and forb growth for small mammals. This would be a long-term, area-wide impact. Generally, water availability is not considered a limiting factor for small mammals.

The improvement in range condition and decrease in utilization would cause a long-term, area-wide decrease in the total number of small mammals in most areas other than riparian areas, even though the number of cottontail rabbits would increase. Smith (1940) found that jackrabbits prefer overgrazed range, while cottontails like moderately grazed range. Monson and Kessler (1940) noted that rodents increase as overgrazing progresses. Wood (1969) says that the closer the vegetation approaches climax, the fewer species and number of rodents the area would support. It is not possible to quantify the change in small mammal numbers due to their normally high variability. This would be a long-term, area-wide impact.

Proposed Action - The construction of range developments would displace or kill some small mammals on the affected 580 acres. The 52 acres of livestock exclosures around 48 wildlife waters and 4 springs would improve cover and forage for small mammals.

As range condition improves (Table 2-6) and utilization decreases from heavy to moderate, total small mammal numbers would decrease, while cottontail rabbit numbers would increase. It is not possible to quantify this change.

No Action Alternative - Small mammals would be displaced or killed by construction of range developments on 90 acres on 8 of the 25 existing AMPs. The 10 acres of livestock exclosures around 9 wildlife waters and 1 spring would improve cover and forage for small mammals. The improvement of vegetative conditions and the reduction of utilization from heavy to moderate on the 25 existing AMPs would reduce the total small mammal numbers, while increasing cottontail rabbit numbers. This change cannot be quantified. The continuation of the present levels of management on 96 non-AMP allotments would not change the existing small mammal habitat.

Livestock Adjustment Alternative - Construction of range developments would displace or kill small mammals on 90 acres on 8 of the 25 existing AMPs. The 10 acres of livestock exclosures around 9 wildlife waters and 1 spring would improve cover and forage for small mammals. There would be no construction of range developments on the 96 non-AMP allotments.

As range condition improves (Table 2-6) and utilization decreases from heavy to moderate, total small mammal numbers would decrease, while cottontail rabbit numbers would increase. This change cannot be quantified.

Pasture Capacity Level Alternative - The construction of range developments would displace or kill some small mammals on the affected 580 acres. The 52 acres of livestock exclosures around 48 wildlife waters and 4 springs would improve cover and forage for small mammals.

As range condition improves (Table 2-6) and utilization decreases from heavy to moderate, total small mammal numbers would decrease, while cottontail rabbit numbers would increase. It is not possible to quantify this change.

Enhancement of Sensitive Resource Values Alternative - During the construction of range developments, some of the small mammals on the affected 607 acres would be displaced or killed. The 52 acres of livestock exclosures around 48 wildlife waters and 4 springs would improve cover and forage for small mammals. The fencing of 12 selected riparian areas totaling 2,320 acres would further improve small mammal habitat. As range condition improves (Table 2-6) and utilization decreases from heavy to moderate, total small mammal numbers would decrease, while cottontail rabbit numbers would increase. This change cannot be quantified.

No Grazing Alternative - Range developments would not be constructed on public land. An estimated 1,475 miles of fences would be constructed on non-public land, affecting those small mammals on the estimated 1,475 acres involved. As range condition improves (Table 2-6) and utilization decreases from heavy to no grazing, total small mammal numbers would decrease, while

cottontail rabbit numbers would increase. It is not possible to quantify this change.

BIRDS

Human activity and noise during construction of range developments would have the short-term, local effect of displacing birds from the immediate area. The birds would probably return to this area after construction has ended. The new fences would provide increased perches for birds. The loggerhead shrike uses the barbs on barb wire to impale and store its prey (Ligon, 1961). The one-acre exclosures around new wildlife waters and springs would provide increased food and cover. New water developments, in addition to the existing 785, would provide watering sites for birds. Campbell (1960) found that availability of water for quail did not significantly increase the quail population. The new waters would affect the fall and winter quail distribution by attracting them to new areas.

The reduced trampling of nests and young birds by livestock would result from improved cover, reduced livestock numbers, deferred pastures, and elimination of grazing. The concentration of livestock in use pastures would have a short-term, local impact of increasing trampling. The reduced trampling of nests and young birds would increase nesting success and survival of ground nesting birds, in particular quail. This would be a long-term, area-wide impact.

Where livestock caused noticeable changes in vegetation, major shifts in the bird community composition were noted (Wiens and Dyer, 1975). The increased vegetative production, density, and cover would increase cover and food available to birds. The increased cover would reduce the loss of birds and their ground nests to trampling and predation. Schemnitz (1961) found that a scaled quail population on overgrazed land was affected by lack of cover. As the vegetative density and cover improved, it provided more cover for quail and their nests. The improved cover would reduce quail mortality to predators and weather. Bird numbers and species diversity would increase with the improved vegetative density and cover. This would be a long-term, area-wide impact which cannot be quantified.

Howard and Wolfe (1976) found that reduced numbers of jackrabbits resulted in reduced reproduction of ferruginous hawks. Raptor distribution would be reduced as a result of reduced jackrabbit numbers. This long-term, area-wide impact cannot be quantified.

Proposed Action - During construction of range developments birds would be displaced from 580 acres. The presence of 214 miles of fences would improve bird habitat by providing perches for birds. The water developments would benefit birds through improved vegetation found in the 52 acres of exclosures around 48 wildlife waters and 4 springs. Bird habitat would be improved by the better water distribution from the additional 79 troughs and 48 wildlife waters.

Trampling of nests and young birds would be reduced when cover increases 3 percent, vegetative production increases 37 percent (in AUMs), utilization decreases from heavy to moderate, and grazing is eliminated on 1,987 acres. The improved vegetative production and composition would provide increased cover and food for birds. This would increase bird numbers and species diversity. This change cannot be quantified. Raptor distribution would be influenced an unquantifiable amount by the reduction in jackrabbit numbers.

No Action Alternative - Birds would be displaced by the construction of range developments on 90 acres on 8 of the 25 existing AMPs. Bird perches would be increased by the addition of 14 miles of fences. The 10 acres of livestock exclosures around 9 wildlife waters and 1 spring would improve cover and food for birds. The addition of 18 troughs and 9 wildlife waters would increase water distribution for birds. The livestock adjustments and grazing systems would improve cover and reduce trampling. This would increase bird numbers and species diversity on the 25 existing AMPs. The continuation of the present levels of management on 96 non-AMP allotments would not change the existing bird habitat.

Livestock Adjustment Alternative - The construction of range developments on 8 of the 25 existing AMPs would displace birds from 90 acres. The 10 acres of livestock exclosures around 9 wildlife waters and 1 spring would improve cover and food for birds. The increased water distribution from the additional 18 troughs and 9 wildlife waters would improve bird habitat.

Trampling of nests and young birds would be reduced when cover increases 2 percent, vegetative production increases 30 percent (in AUMs), utilization decreases from heavy to moderate, and grazing is eliminated on 1,987 acres. The improved vegetative production and composition would also provide increased cover and food for birds. This would increase bird numbers and species diversity. This change cannot be quantified. Raptor distribution would be influenced an unquantifiable amount by reduced jackrabbit numbers. There would be no construction of range developments on the 96 non-AMP allotments.

Pasture Capacity Level Alternative - During construction of range developments birds would be displaced from 580 acres. The presence of 214 miles of new fences would provide additional

perches for birds. Bird habitat would be improved by improved vegetation on 52 acres of exclosures around 48 wildlife waters and 4 springs. Improved water distribution from 79 additional troughs and 48 wildlife waters would improve bird habitat.

Trampling of nests and young birds would be reduced when cover increases 8 percent, vegetative production increases 61 percent (in AUMs), utilization decreases from heavy to light, and grazing is eliminated on 1,987 acres. The improved vegetative production and composition would also provide increased cover and food for birds. The improved composition would increase bird numbers and species diversity. This change cannot be quantified. Raptor distribution would be influenced an unquantifiable amount by the reduction in jackrabbit numbers.

Enhancement of Sensitive Resource Values Alternative - During construction of range developments birds would be displaced on 607 acres. The presence of 241 miles of new fences would provide additional bird perches. The 52 acres of livestock exclosures around 48 wildlife waters and 4 springs would increase cover and food for birds. The increased water distribution from the 79 additional troughs and 48 wildlife waters would improve bird habitat.

Trampling of nests and young birds would be reduced when cover increases 8 percent, vegetative production increases 64 percent (in AUMs), utilization decreases from heavy to light, and grazing is eliminated on 218,191 acres in the short term and 22,286 acres in the long term. The improved vegetative production and composition and exclosures around 2,320 acres from 12 selected riparian areas would also provide increased cover and food for birds. This would increase bird numbers and species diversity. This change cannot be quantified. Raptor distribution would be influenced an unquantifiable amount by reduced jackrabbit numbers.

No Grazing Alternative - The elimination of grazing on 838,808 acres of public land would eliminate the impact of livestock trampling. No range developments would be constructed on public land; however, the addition of 1,475 miles of fences on non-public land would provide increased perches for birds. The 8-percent improvement in cover, decreased utilization from heavy to ungrazed, and the elimination of grazing on 838,808 acres would reduce trampling of nests and young birds. The improved vegetative production and composition would increase for birds. This change cannot be quantified. Raptor distribution would be influenced an unquantifiable amount by reduced jackrabbit numbers.

THREATENED OR ENDANGERED SPECIES

The U. S. FWS was contacted regarding possible impacts on federally endangered species habitat as required under Section 7 of the Endangered Species Act of 1973. Endangered species historically occurring in the ES Area include the bald eagle, black-footed ferret, and peregrine falcon. The Socorro isopod and whooping crane are found on lands adjacent to the ES Area. On July 28, 1978 FWS responded to BLM's consultation request and their general findings are as follows: It is the biological opinion of the FWS that neither the continued existence of endangered species nor the habitat essential to their survival would be affected.

Three State listed species occur on public land (Table 2-29) in the area. Two of these, the little blue heron, and the Olivaceous cormorant, nest over water and would not be impacted. Baird's sparrow may migrate through the area but would not be impacted.

Four other species on the State list (Mississippi kite, Bell's Vireo, Osprey and Redheaded woodpecker) are found on the Bosque del Apache Refuge adjacent to the ES Area. These species have not been observed on public lands. The habitat type, tall trees and open water, for these species is not impacted.

Proposed Action - No impacts to T or E species should occur.

No Action Alternative - No impacts to T or E species should occur.

Livestock Adjustment Alternative - No impacts to T or E species should occur.

Pasture Capacity Level Alternative - No impacts to T or E species should occur.

Enhancement of Sensitive Resource Values Alternative - No impacts to T or E species should occur.

No Grazing Alternative - No impacts to T or E species should occur.

UNIQUE RIPARIAN AREAS

Livestock adjustments and grazing systems would improve production, density, cover, composition, and condition in the seven unique riparian areas. This would improve habitat for birds and small mammals. This impact cannot be quantified.

Proposed Action - Livestock grazing would decrease from heavy to moderate on five areas and would remain at the present light to moderate level on Ponia Creek and the Mesa Carrizo stream. This would cause an unquantifiable improvement in riparian habitat.

No Action Alternative - Utilization would decrease from heavy to moderate on Ponia Creek, Arroyo Colorado Springs, and Las Canas Spring; these areas are within the 25 existing AMP allot-

ments that would continue to be intensively managed. The improvement in riparian habitat would be unquantifiable. Because there would be no change on the non-AMP allotments, riparian habitat of the other unique areas would not change.

Livestock Adjustment Alternative - Utilization would decrease from heavy to moderate on Ponia Creek, Arroyo Colorado Springs, and Las Canas Spring, these areas are within the 25 existing AMP allotments that would continue to be intensively managed. The improvement in riparian habitat would be unquantifiable. Because there would be no change on the non-AMP allotments, riparian habitat of the other unique areas would not change.

Pasture Capacity Level Alternative - Utilization would decrease from heavy to moderate on five areas and would remain at the present moderate level on Ponia Creek and Mesa Carrizo stream. This would cause an unquantifiable improvement in riparian habitat.

Enhancement of Sensitive Resource Values Alternative - On Ponia Creek utilization would continue to be moderate. On Ojo Saladito utilization would decrease from heavy to moderate. About one-half (2 miles) of the Mesa Carrizo stream and all of the Rio Salado except that portion on allotment 121 would be ungrazed. Utilization would decrease from heavy to moderate on the remaining part of Mesa Carrizo stream and that part of the Rio Salado occurring on allotment 121. Las Canas Spring and Elephant Butte Marsh would not be grazed under this alternative. This would cause an unquantifiable improvement in riparian habitat.

No Grazing Alternative - Four areas, Ponia Creek, Arroyo Colorado Springs, Las Canas Spring, and Ojo Saladito, are totally on private land and would continue to be grazed as they presently are. There would be no improvement in riparian habitat on these areas. Two areas, Mesa Carrizo Streams and Rio Salado, are located on both private and public lands. The portions of these areas on public land would be ungrazed. Use on the remainder would not change as grazing would continue at the present level. Elephant Butte Marsh would not be grazed under this alternative. There would be an unquantifiable improvement in riparian habitat in these ungrazed areas.

AQUATIC HABITAT

Excessive livestock utilization would impact aquatic habitat through the removal of stream bank cover, trampling of stream banks, and lowering of water quality. The removal of stream bank cover would remove shade producing shrubs and open the banks up to erosion. The trampling of stream banks would beat down the banks and open them up to increased erosion. The reduced shade and increased water turbidity would reduce water quality.

The present slight to moderate livestock utilization in Ponia Creek is not expected to change. Its small disturbance to vegetation due to limited livestock access would have no impacts on the aquatic habitat. The present high water level of 800 surface acres of the Elephant Butte Marsh limits livestock utilization to the edge of the Marsh. The slight to heavy livestock utilization on the Marsh's edge would not impact aquatic habitat.

Proposed Action - The aquatic habitat and species in Ponia Creek and Elephant Butte Marsh would not be changed from their present condition.

No Action Alternative - The aquatic habitat and species in Ponia Creek and Elephant Butte Marsh would not be changed from their present condition.

Livestock Adjustment Alternative - The aquatic habitat and species in Ponia Creek and Elephant Butte Marsh would not be changed from their present condition.

Pasture Capacity Level Alternative - The aquatic habitat and species in Ponia Creek and Elephant Butte Marsh would not be changed from their present condition.

Enhancement of Sensitive Resource Values Alternative - The aquatic habitat and species in Ponia Creek and Elephant Butte Marsh would not be changed from their present condition.

No Grazing Alternative - The aquatic habitat and species in Ponia Creek and Elephant Butte Marsh would not be changed from their present condition.

CUMULATIVE IMPACTS

Proposed Action - Deer numbers would remain stable, while antelope numbers would increase from 648 to 763 in the long term. Total small mammal numbers would decrease, while cottontail rabbit numbers would increase. Bird numbers and species diversity would increase. T or E species would not be impacted.

No Action Alternative - On the 25 existing AMPs deer numbers would be stable, while antelope numbers would increase 17 animals for a total of 665. Total small mammal numbers would decrease, while cottontail rabbit numbers would increase. The continuation of the present management on 96 non-AMP allotments would not change the existing wildlife habitat. T or E species would not be impacted.

Livestock Adjustment Alternative - Deer numbers would remain stable, while antelope numbers would increase from 648 to 712 in the long term.

Total small mammal numbers would decrease, while cottontail rabbit numbers would increase. Bird numbers and species diversity would increase. T or E species would not be impacted.

Pasture Capacity Level Alternative - Deer numbers would remain stable, while antelope numbers would increase from 648 to 773 in the long term. Total small mammal numbers would decrease, while cottontail rabbit numbers would increase. T or E species would not be impacted.

Enhancement of Sensitive Resource Values Alternative - Deer numbers would remain stable, while antelope numbers would increase from 648 to 779 in the long term. Total small mammal numbers would decrease, while cottontail rabbit numbers would increase. T or E species would not be impacted.

No Grazing Alternative - Deer numbers would remain stable, while antelope numbers on public land would increase 72 animals for a total of 720 in the long term. Total small mammal numbers would decrease, while cottontail rabbit numbers would increase. Bird numbers and species diversity would increase. T or E species would not be impacted.

Unavoidable Adverse Impacts

The Proposed Action would have unavoidable adverse impacts on wildlife. The increases in human activity and added hazards due to construction, fences and cattleguards, and grazing systems would impact all wildlife. The unauthorized use of temporary roads would place stress on wildlife near the roads. The roads would open the area to poachers. The construction of range developments would remove 580 acres of forage from use. This unavoidable impact would be short term. Some forage should return in 4 to 5 years with 339 acres impacted in the long term.

The concentration of livestock in use pastures would tend to displace deer in that pasture or location.

The concentration of livestock in grazed pastures would increase competition between livestock and wildlife within the pasture. As forage improves, the impact would be reduced but would never be completely eliminated.

WILD HORSES

Existing Environment

DESCRIPTION OF AREA

The Bordo Atravesado Wild Horse Management Area, located on the Bordo Atravesado (254) Allotment, is approximately 18 miles northeast of Socorro, New Mexico (Visual A). There are 19,606 acres in the wild horse management area consisting of 16,493 acres of public land (84 percent), 548 acres of private land (3 percent), and 2,565 acres of State land (13 percent).

The topography is generally mountainous with rolling limestone hills. The elevation varies between 5,525 and 6,600 feet. The vegetative aspect is juniper. The percent average composition of major vegetative species within the wild horse management area is summarized in Table 2-30.

DESCRIPTION AND SOCIAL ORGANIZATION

The wild horses of the Bordo Atravesado Herd are smaller in size than domestic horses. The herd is comprised of three bands. Two of the bands consist of mares controlled by a stallion; the third band is a small group of stallions. In late fall the bands of horses join together into a single herd and are controlled by one stallion with a lead mare.

BEHAVIOR

The free roaming behavior of the wild horses was somewhat disrupted when an AMP was implemented in 1968. This implementation resulted in dividing the home range of the horses into three pastures. These are the Bustos, New Well, and New Tank pastures (Map 2-9). Reports or signs of wild horse activity have been rare on adjacent allotments. Inventories since 1974 show that the horses are not completely restricted by pasture fences. The horses have found small crossings into the pastures across mountainous terrain; however, these passages are not usually accessible by livestock. During deer hunting season (November) the horses leave the New Tank Pasture and migrate into Bustos or New Well Pasture. The horses move into Bustos Pasture through a natural barrier (rim rock) and into New Well Pasture through natural crossings and open gates at New Tank Reservoir.

FOOD HABITS

Based on a four-season fecal study of the Bordo Atravesado wild horse herd, Summer 1976 - Spring 1977, the horses' diet is made up of 84 percent grasses, 8 percent shrubs, and 8 percent forbs. Grasses made up as much as 98 percent of their diet in the summer and as little as 64 percent in the winter. Shrubs made up as much as 16 percent of their diet in the fall and as little as 1 percent in the summer. Forbs made up 25 percent of their diet in the winter and 0 percent in the summer (Table 2-30).

COMPETITION

Dietary overlap between cattle, deer, and wild horses was calculated from fecal study analysis

TABLE 2-30

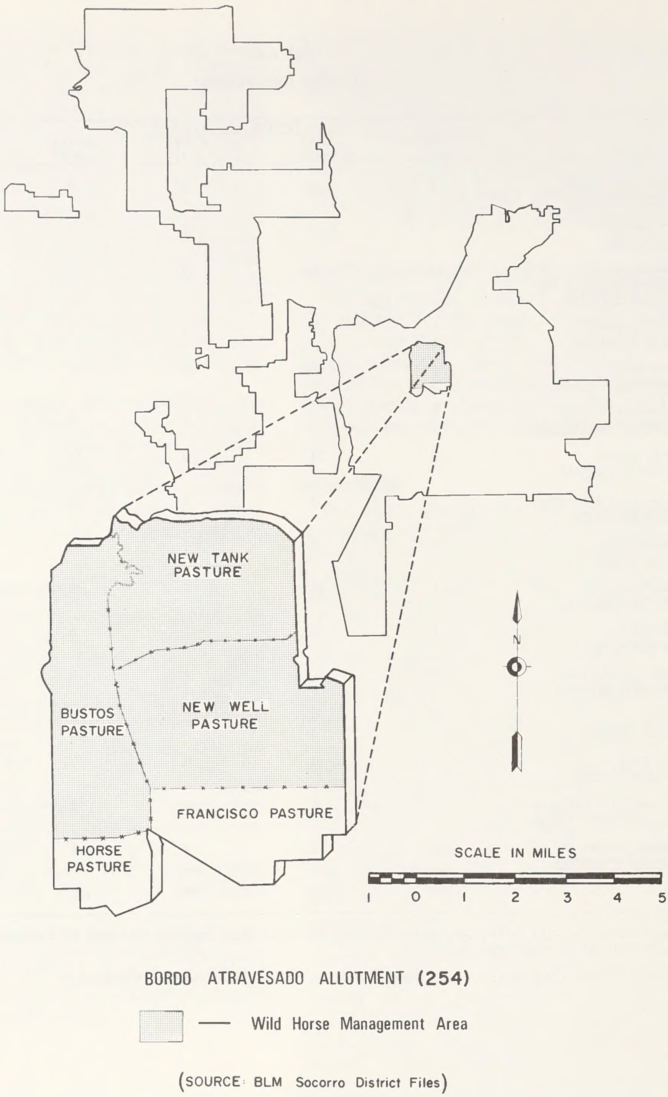
WILD HORSE FOOD HABITS a/

Major Plants	Percent in Diet Summer 1976	Fall 1976	Winter 1977	Spring 1977	Percent Average Composition b/
Western wheatgrass *Agropyron smithii*	3	3	0	0	Tr.
Three-awn grass *Aristida spp.*	4	3	2	3	Tr.
Grama grass *Bouteloua eriopoda* and *Bouteloua gracilis*	43	38	25	46	26
Wolf-tail grass *Lycurus phleoides*	6	3	1	4	Tr.
Purple muhly *Muhlenbergia rigida*	6	13	10	15	18
Burro grass *Scleropogon breviflorus*	1	2	0	0	Tr.
Sacaton grass *Sporobolus wrightii*	32	14	20	17	3
New Mexico feathergrass *Stipa neomexicana*	2	3	5	8	Tr.
Slim tridens *Tridens mutica*	1	2	1	0	Tr.
Slendergray sage *Artemisia bigelovii*	1	16	9	5	Tr.
Buckwheat *Eriogonum wrightii*	1	0	21	0	Tr.
Gordon's bladderpod *Lesquerella gordonii*	0	1	4	2	Tr.
Galleta *Hilaria jamesii*	0	0	0	0	3
Hairy grama *Bouteloua hirsuta*	0	0	0	0	2
Hairy mountain mahogany *Cercocarpus breviflorus*	0	0	0	0	2
One-seed juniper *Juniperus monosperma*	0	0	0	0	9
TOTAL	100	98	98	100	

Sources:

a/ Food habits for wild horses were determined from the fecal study analysis performed by the Composition Analysis Laboratory at Colorado State University.

b/ Based on 1975-77 BLM Range Survey. Percent average composition of available vegetation.



MAP 2-9. Wild Horse Management Area in the Bordo Atravesado Allotment (254)

performed by Colorado State University. The dietary overlap between wild horses and deer during summer, fall, winter, and spring is 1, 1, 4, and 1 percent, respectively. The dietary overlap between wild horses and livestock during summer, fall, winter, and spring is 76, 62, 47, and 68 percent, respectively.

Competition between wild horses and deer for food, water, space, and cover appears to be slight in the wild horse area. Cattle and horses compete from a moderate to heavy degree for the same plants. No apportionment of forage for wild horses was made when the AMP was originally implemented. The competition between cattle and wild horses for space, water, and cover does not seem to be a problem in the wild horse area. Deer have been seen browsing less than 50 feet from a wild horse band, and cattle have been seen grazing within the primary horse use areas (aerial reconnaissance). A high density of deer and cattle fecal material has been observed within primary wild horse use areas.

POPULATION STATUS

Aerial reconnaissance inventories made from November 1975 through October 1977 show that wild horse numbers have fluctuated from 32 to 43. The population trend is undetermined. A wild horse management plan is to be written. This plan will use information on population characteristics such as: sex ratio, age structure, and population trend to set the number of horses to be managed for.

Future Environment

Allotment 254 is covered by an existing AMP; therefore, it would continue to be intensively managed. As cattle numbers are adjusted to balance grazing use with forage production and forage is apportioned to wild horses and deer, demand upon the vegetative resource would not exceed forage production. In the long term forage is expected to increase from 384 to 549 AUMs. This would be sufficient forage to support 46 wild horses (Table 2-31).

Impacts

FOOD HABITS

Grasses, a wild horse preferred forage, were the species that were predicted to increase with intensive management. The production of shrubs was also predicted to have a small increase.

Proposed Action - As cattle numbers are decreased from 202 to 100 AUs in the wild horse area and the wild horse herd is apportioned 384 AUMS of forage, demand upon the present vegetative resource would be brought into line with present forage production. This would insure that an adequate supply of forage is available for the horse herd in the short term. In the long term total forage production on the allotment is expected to increase to 3,217 AUMs with grasses making up the majority of the increase. Five hundred and forty-nine (549) AUMs of this forage would be apportioned to wild horses. This would provide an abundant supply of wild horse preferred forage species (Table 2-31).

No Action Alternative - Because allotment 254 is an existing AMP allotment, intensive management would continue; therefore, as cattle numbers are decreased from 202 to 100 AUs and the wild horse herd is apportioned 384 AUMs of forage, demand upon the present vegetative resource would be brought into line with present forage production. This would insure that an adequate supply of forage is available for the horse herd in the short term. In the long term forage production on the allotment is expected to increase to 3,217 AUMs with grasses making up the majority of the increase. Five hundred and forty-nine (549) AUMs of this forage would be apportioned to wild horses. This would provide an abundant supply of wild horse preferred forage species (Table 2-31).

Livestock Adjustment Alternative - Because allotment 254 is an existing AMP allotment, intensive management would continue; therefore, as cattle numbers are decreased from 202 to 100 AUs and the wild horse herd is apportioned 384 AUMs of forage, demand upon the present vegetative resource would be brought into line with present forage production. This would insure that an adequate supply of forage is available for the horse herd in the short term. In the long term forage production on the allotment is expected to increase to 3,212 AUMs with grasses making up the majority of the increase. Five hundred and forty-nine (549) AUMs of this forage would be apportioned to wild horses. This would provide an abundant supply of wild horse preferred forage species (Table 2-31).

Pasture Capacity Level Alternative - As cattle numbers are decreased from 202 to 100 AUs and the wild horse herd is allocated 384 AUMs of forage, demand upon the present vegetative resource would be brought into line with present forage production. This would insure that an adequate supply of forage is available for the horse herd in the short term. In the long term forage production on the allotment is expected to increase to 3,217 AUMs with grasses making up the majority of the increase. Five hundred and forty-nine (549) AUMs of this forage would be apportioned to wild horses. This would provide an abundant supply of wild horse preferred forage species (Table 2-31).

TABLE 2-31

FORAGE DISTRIBUTION OF SHORT- AND LONG-TERM PREDICTIONS FOR THE WILD HORSE MANAGEMENT AREA

		NA/FE		PA/LA		PCL		ESR		NG	
	EE	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term
Wild Horse Numbers 1/	32	32	46	32	46	32	46	132	259	141	295
Acres (Wild Horse Home Range)	19,606	19,606	19,606	19,606	19,606	19,606	19,606	19,606	19,606	19,606	19,606
Wild Horses AUMs	0	384	549	384	549	384	549	1,583	3,111	1,695	3,535

/1 Horse numbers are based solely on forage distribution and predicted increases. Population characteristics of the wild horse herd are unknown and could not be used to predict changes in horse numbers.

EE - EXISTING ENVIRONMENT
NA/FE - NO ACTION ALTERNATIVE AND FUTURE ENVIRONMENT
PA - PROPOSED ACTION
LA - LIVESTOCK ADJUSTMENT ALTERNATIVE
PCL - PASTURE CAPACITY LEVEL ALTERNATIVE
ESR - ENHANCEMENT OF SENSITIVE RESOURCE VALUES ALTERNATIVE
NG - NO GRAZING ALTERNATIVE

Source: Table A-1 (Appendix 1, p. A-1) and Table A-18 (Appendix 2, p. A-58)

Enhancement of Sensitive Resource Values Alternative - All cattle grazing would be eliminated from the three pastures comprising the wild horse management area. In the short term the forage that would be available to the horses would be 1,583 AUMs in these three pastures. In the long term total forage production on the allotment is expected to increase to 4,305 AUMs with grasses making up the majority of the increase. Three thousand one hundred and eleven (3,111) AUMs of this forage would be apportioned to wild horses (Table 2-31). The remainder of the AUMs would be apportioned to wildlife in the wild horse management area and to wildlife and cattle on the remainder of the allotment.

No Grazing Alternative - All cattle grazing would be eliminated from the public land within the wild horse management area. In the short term the forage that would be available to the horses would be 1,695 AUMs. In the long term forage production on the allotment is expected to increase to 4,200 AUMs with grasses making up the majority of the increase. Three thousand five hundred and thirty-five (3,535) AUMs of this forage would be apportioned to wild horses (Table 2-31). The remainder of the AUMs would be apportioned to wildlife (from public land) and to cattle on the private and State land.

COMPETITION

The fecal analysis study conducted over a four season period indicated that horses and deer are not competing for the same forage plants in the wild horse area. Based on the study the dietary overlap between wild horses and deer is 4 percent during the winter and 1 percent during the remainder of the year. The study indicated, however, that cattle and horses are directly competing for the same forage plants. The dietary overlap between wild horses and cattle during the summer, fall, winter, and spring was 76, 62, 47, and 68 percent, respectively.

Proposed Action - As cattle numbers are reduced from 202 to 100 AUs and 384 AUMs of forage are apportioned to wild horses, demand on the vegetative resource would be brought into line with present forage production in the short term. Although cattle and horses would still be competing for the same kind of plants, grazing use would not exceed production; therefore, competition for food would be reduced. In the long term use would be kept in line with production; therefore, competition for food would also be reduced. Deer would be apportioned 67 AUMs of forage in the short term and 71 AUMs of forage in the long term, based on existing and predicted numbers. This would prevent any wild horse and deer competition for food.

No Action Alternative - As cattle numbers are reduced from 202 to 100 AUs and 384 AUMs of forage are apportioned to wild horses, demand on the vegetative resource would be brought into line with present forage production in the short term. Although cattle and horses would still be competing for the same kind of plants, grazing use would not exceed production; therefore, competition for food would be reduced. In the long term use would be kept in line with production; therefore, competition for food would also be reduced. Deer would be apportioned 67 AUMs of forage in the short term and 71 AUMs in the long term, based on existing and predicted numbers. This would prevent any wild horse and deer competition for food.

Livestock Adjustment Alternative - As cattle numbers are reduced from 202 to 100 AUs and 384 AUMs of forage are apportioned to wild horses, demand on the vegetative resource would be brought into line with present forage production in the short term. Although cattle and horses would still be competing for the same kind of plants, grazing use would not exceed production; therefore, competition for food would be reduced. In the long term use would be kept in line with production; therefore, competition for food would also be reduced. Deer would be apportioned 67 AUMs of forage in the short term and 71 AUMs in the long term, based on existing and predicted numbers. This would prevent any wild horse and deer competition for food.

Pasture Capacity Level Alternative - As cattle numbers are reduced from 202 to 100 AUs and 384 AUMs of forage are apportioned to wild horses, demand on the vegetative resource would be brought into line with present forage production in the short term. Although cattle and horses would still be competing for the same kind of plants, grazing use would not exceed production; therefore, competition for food would be reduced. In the long term use would be kept in line with production; therefore, competition for food would also be reduced. Deer would be apportioned 67 AUMs of forage in the short term and 71 AUMs in the long term, based on existing and predicted numbers. This would prevent any wild horse and deer competition for food.

Enhancement of Sensitive Resource Values Alternative - Cattle grazing would be eliminated in the wild horse home range. There would be no competition between horses and cattle. Deer would be apportioned 67 AUMs in the short term and 71 AUMs in the long term, based on existing and predicted numbers. This would prevent any wild horse and deer competition for food.

No Grazing Alternative - Cattle grazing would be eliminated on all public land within the allot-

ment. There would be no competition between horses and cattle. Deer would be apportioned 67 AUMs in the short term and 71 AUMs in the long term, based on existing and predicted numbers. This would prevent any wild horse and deer competition for food.

POPULATION

Very little is known about the population characteristics of the wild horse herd. Also, the wild horse management plan has not been written. The numbers to be managed would be decided upon through this plan; therefore, the predicted increase of horse numbers is based solely on the predicted forage increases of preferred wild horse forage species for the Proposed Action and each alternative.

Proposed Action - In the short term 384 AUMs would be apportioned to the wild horses. This is sufficient forage to support 32 wild horses. In the long term forage for wild horses is expected to increase to 549 AUMs within the management area. This would be sufficient forage to support 46 wild horses (Table 2-31).

No Action Alternative - In the short term 384 AUMs would be apportioned to the wild horses. This is sufficient forage to support 32 wild horses. In the long term forage for wild horses is expected to increase to 549 AUMs within the management area. This would be sufficient forage to support 46 wild horses (Table 2-31).

Livestock Adjustment Alternative - In the short term 384 AUMs would be apportioned to the wild horses. This is sufficient forage to support 32 wild horses. In the long term forage for wild horses is expected to increase to 549 AUMs within the management area. This would be sufficient forage to support 46 wild horses (Table 2-31).

Pasture Capacity Level Alternative - In the short term 384 AUMs would be apportioned to the wild horses. This is sufficient forage to support 32 wild horses. In the long term forage for wild horses is expected to increase to 549 AUMs within the management area. This would be sufficient forage to support 46 wild horses (Table 2-31).

Enhancement of Sensitive Resource Values Alternative - Cattle grazing would be eliminated in the wild horse area. In the short term 1,583 AUMs would be apportioned to the wild horses. This is sufficient forage to support 132 wild horses. In the long term forage for wild horses is expected to increase to 3,111 AUMs within the management area. This would be sufficient forage to support 259 wild horses (Table 2-31).

No Grazing Alternative - Under this alternative all cattle grazing would be eliminated on public lands within the allotment. Based on available forage the home range could support 141 wild horses in the short term. In the long term forage is expected to increase to 3,535 AUMs. This would be sufficient forage to support 295 wild horses (Table 2-31).

CUMULATIVE IMPACTS

Proposed Action - Grasses, the preferred wild horse forage species, are predicted to increase in the long term and provide an abundant supply of forage. Competition for food would be reduced in the short and long terms by apportioning 384 and 549 AUMs, respectively, to the wild horses. There would be sufficient forage to support 32 and 46 horses in the short and long terms, respectively.

No Action Alternative - Grasses, the preferred wild horse forage species, are predicted to increase in the long term and provide an abundant supply of forage. Competition for food would be reduced in the short and long terms by apportioning 384 and 549 AUMs, respectively, to the wild horses. There would be sufficient forage to support 32 and 46 horses in the short and long terms, respectively.

Livestock Adjustment Alternative - Grasses, the preferred wild horse forage species, are predicted to increase in the long term and provide an abundant supply of forage. Competition for food would be reduced in the short and long terms by apportioning 384 and 549 AUMs, respectively, to the wild horses. There would be sufficient forage to support 32 and 46 horses in the short and long terms, respectively.

Pasture Capacity Level Alternative - Grasses, the preferred wild horse forage species, are predicted to increase in the long term and provide an abundant supply of forage. Competition for food would be reduced in the short and long terms by apportioning 384 and 549 AUMs, respectively, to the wild horses. There would be sufficient forage to support 32 and 46 horses in the short and long terms, respectively.

Enhancement of Sensitive Resource Values Alternative - Grasses, the preferred wild horse forage species, are predicted to increase in the long term. Competition for food would be eliminated in the short and long terms. In the short and long terms 1,583 and 3,111 AUMs, respectively, would be apportioned to the wild horses. There would be sufficient forage to support 132 and 259 horses in the short and long terms, respectively.

No Grazing Alternative - Grasses, the preferred wild horse forage species, are predicted to increase in the long term. Competition for food would be eliminated in the short and long terms. In the short and long terms 1,695 and 3,535 AUMs, respectively, would be apportioned to the

wild horses. There would be sufficient forage to support 141 and 295 horses in the short and long terms, respectively.

CULTURAL RESOURCES

Existing Environment

Cultural resources in the ES Area were identified through three surveys. The first survey was a literature search conducted by the School of American Research in 1975. The second and third surveys were part of a stratified random sample design and were conducted by New Mexico State University in 1976 and 1977; they did not, however, cover the entire ES Area. These reports are filed at the BLM Socorro District Office. As a result of these surveys 332 archaeological sites have been recorded. Of this total, 204 sites are on public lands. Consultation with the State Historic Preservation Officer was initiated on November 4, 1976 to determine the presence of other cultural resources, particularly those on, or eligible for inclusion in, the National Register of Historic Places.

Sites in this region suggest human habitation for 15,000 years. Identified cultural affinities of the sites are Paleo-Indian, Archaic, Anasazi, Jornada Mogollon, Historic Piro, Spanish-American, and Anglo-American. Site functions are usually campsites, permanent habitations, or procurement/processing loci; other functions include prehistoric defense, socio-religious activities, mining, and historic warfare.

Few reports have been published on the early cultures of this region. As a result, the ideas concerning cultural use are inferred from studies in surrounding areas. Further information on various cultures can be found in the following references:

Paleo-Indian - Wormington, 1957 and Judge, 1973

Archaic - Campbell and Ellis, 1952; Dick, 1965; and Irwin-Williams, 1973

Anasazi/Jornada Mogollon - Kidder, 1923; Marshall, 1973; Mera, 1940; and Wormington, 1947

Piro - Scholes, 1940 and Vivian, 1964

Spanish-American - Bolton, 1949 and Day, 1940

Existing data indicates four areas of high site density. These are Arroyo Colorado, Rio Salado, Rio Grande Valley, and Chupadera Wash-Jornada del Muerto (Map 2-10). Arroyo Colorado may have a high site density; only nine sites were located in the literature search, and no systematic surveys have been conducted. However, the cluster of sites is much greater than in surrounding areas and could indicate a high site density. The Rio Salado has 51 sites recorded. There are 74 sites in BLM site files that are located in the Rio Grande Valley. The Chupadera Wash-Jornada del Muerto area contains 78 recorded sites. Allotments located in high site density areas are listed in Table 2-32.

CONDITION OF SITES

The 129 sites recorded during the New Mexico State University surveys are in various stages of deterioration. Site conditions are as follows: Excellent - 2, Good - 68, Fair/Good - 5, Fair - 31, Poor/Fair - 4, Poor - 17, Indeterminate - 2. (The condition of these two sites cannot be determined due to rockfall.)

Causes affecting the condition of sites are shown in Table 2-33. 'Natural Detrimental' causes are those forces destroying a site excluding erosion. This includes packrat nests, juniper trees, etc. Erosion is affecting the greatest percentage of sites (40 percent); the amount of erosion varies from slight to severe. Only two sites in the survey were recorded as having been vandalized.

Due to inconsistencies or lack of information, the condition of sites recorded in the literature search cannot be adequately discussed. Several sites have experienced severe vandalism, including bulldozing. The rate of vandalism is believed to be greater than reflected by the survey data. Reasons for this difference are accessibility and visibility of sites. Areas that received systematic surveys are often away from population centers and heavily used roads, and the sites are usually campsites or small rubble mounds. In areas where no such surveys occurred, there are large, easily identifiable, puebloan rubble mounds.

Erosion is presently the most significant source of cultural resource deterioration. The rate of erosion on sites is difficult to predict. Erosion would cause vertical and horizontal displacement of artifacts as well as site destruction. (Table 2-34)

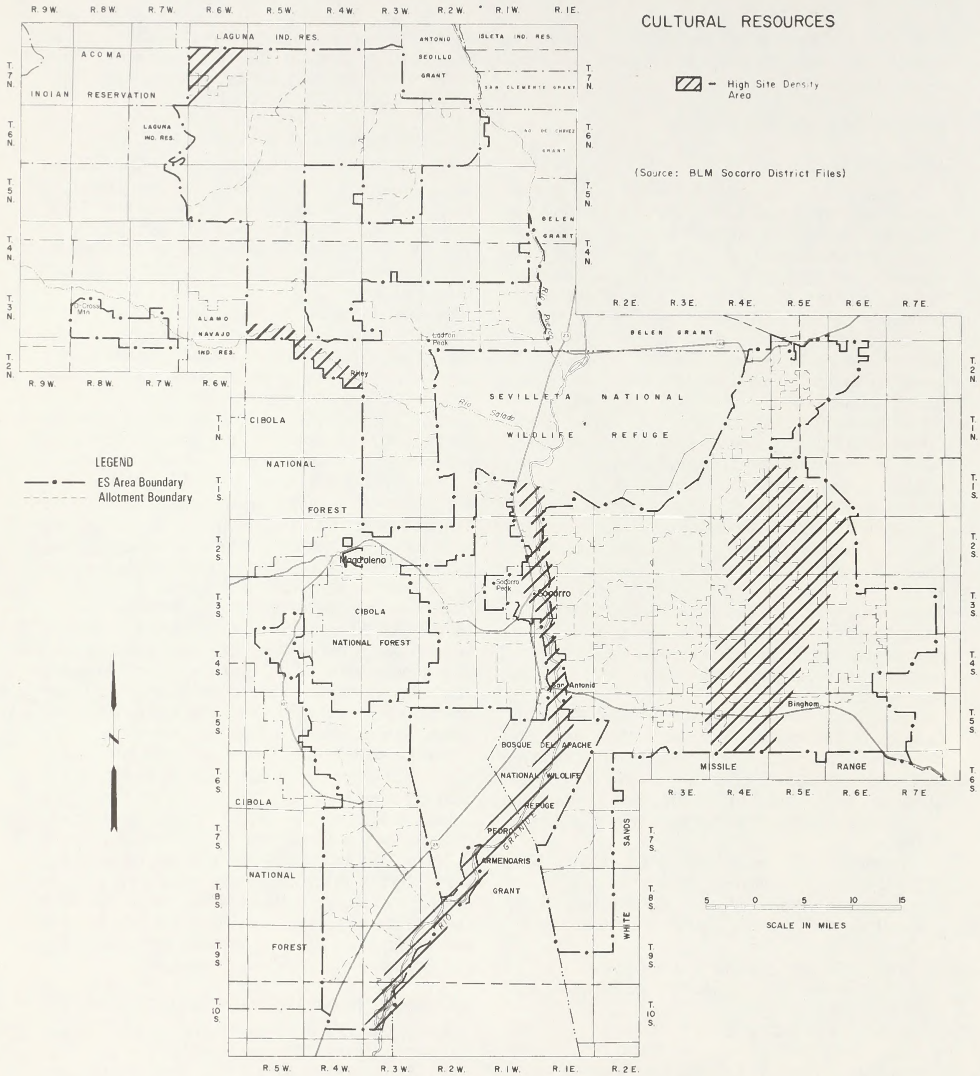
Table 2-34 shows the acres of various sediment yield classes in the high site density areas. Any erosion occurring in these areas would be more likely to damage sites. Areas in the severe sediment yield class are river washes and badlands; it is improbable that sites would exist here.

NATIONAL REGISTER OF HISTORIC PLACES

According to the current listing of the National Register of Historic Places (Federal Register, February 7, 1978), there are no National Register properties on public land within the ES Area.

Requests for determination of eligibility for nomination to the National Register and the responses of the State Historic Preservation Officer (SHPO) are on file at the Socorro District Office. Sites on public land that have been determined by the SHPO to be eligible for nomination are:

Riley Spring Archaeological District



MAP 2-10. Cultural Resources

TABLE 2-32

ALLOTMENTS IN HIGH SITE DENSITY AREAS

Arroyo Colorado	Rio Salado	Rio Grande Valley	Chupadera Wash - Jornada del Muerto
083 Big Sandy Wash	012 Riley Community	250 Milligan Gulch	251 Harless
090 Petoch Wash	016 Puertecito & Barranco	253 E. Vigil Ind.	256 Llano
129 Arroyo Colorado	121 Rio Salado West	255 Bosquecito	260 Sierra Larga
165 R. Lucero Ind.		258 Ojo de Amado	266 Coyote Spring
		261 Sheep Canyon	271 Mesa Redonda
		272 San Pasqual River	275 Adobe, Hansenburg, Padilla
		277 San Jose Canyon	284 Mesa Canyon Well
		279 Silver Canyon	289 Jornada Community
		288 Rio Grande	291 Prairie Spring
		302 Marshall Ind.	301 Bennett-Wilson
		306 Veranito	310 Orndorff Ind.
		312 La Arenosa	325 West Williams
		318 Pueblito Comm.	330 East Williams
		363 San Antonio	340 Bishop Ind.
			350 South Rainwater
			352 Sais Ind.
			360 Chupadera

Source: BLM Socorro District Files

TABLE 2-33

CAUSES AFFECTING THE CONDITION OF SITES*

Condition of Site	Natural Beneficial	Natural Detrimental	Erosion	Vandalism
Poor		5	13	1
Poor-Fair			5	
Fair	4	10	18	
Fair-Good	1	2	2	1
Good	33	24	17	
Excellent		1	1	
Indeterminate	2	1		

* Total adds up to more than the total number of sites (129) because some sites are experiencing more than one source of deterioration

Source: BLM Socorro District Files

TABLE 2-34

ACRES OF SEDIMENT YIELD CLASSES IN HIGH SITE DENSITY AREAS

	Stable	Slight	Moderate	Critical	Severe /1	Unknown
Existing Environment /2						
Arroyo Colorado	0	1,341	7,569	2,574	0	28
Rio Salado	0	25	6,282	7,130	830	0
Rio Grande	0	13,771	7,935	715	4,001	0
Chupadera	0	82,312	69,915	10,597	1,575	194
TOTAL	0	97,449	91,701	21,016	6,406	222
Proposed Action /2						
Arroyo Colorado	0	5,748	3,724	2,012	0	28
Rio Salado	0	46	6,261	7,130	830	0
Rio Grande	0	18,681	3,025	715	4,001	0
Chupadera	0	125,015	34,112	3,697	1,575	194
TOTAL	0	149,490	47,122	13,554	6,406	222
No Action Alternative/Future Environment /2						
Arroyo Colorado	0	1,581	7,395	2,508	0	28
Rio Salado	0	24	6,283	7,130	830	0
Rio Grande	0	15,315	6,391	715	4,001	0
Chupadera	0	82,415	69,812	10,597	1,575	194
TOTAL	0	99,335	89,881	20,950	6,406	222
Livestock Adjustment Alternative /2						
Arroyo Colorado	0	5,748	3,724	2,012	0	28
Rio Salado	0	46	6,261	7,130	830	0
Rio Grande	0	18,681	3,025	715	4,001	0
Chupadera	0	119,176	39,951	3,697	1,575	194
TOTAL	0	143,651	52,961	13,554	6,406	222
Pasture Capacity Level/Enhancement of Sensitive Resource Values Alternatives /2						
Arroyo Colorado	0	5,932	4,107	1,445	0	28
Rio Salado	0	2,242	9,797	1,398	830	0
Rio Grande	621	18,060	3,025	715	4,001	0
Chupadera	0	128,104	31,023	3,697	1,575	194
TOTAL	621	154,338	47,952	7,255	6,406	222
No Grazing Alternative /2						
Arroyo Colorado	0	8,910	2,574	0	0	28
Rio Salado	15	6,292	6,169	961	830	0
Rio Grande	11,727	9,979	0	715	4,001	0
Chupadera	46,909	103,887	8,331	3,697	1,575	194
TOTAL	58,651	129,068	17,074	5,373	6,406	222

/1 Severe includes riverwash which does not fall into any range site. Therefore, it is not included in the severe sediment yield class of the Soils Section, but it can safely be included in the severe class.
/2 Total acreage for high site density area is 216,794 for each alternative.

Source: BLM Socorro District Files

Mockingbird Paleo-Indian Archaeological District
NM-02-205
NM-02-231 7NM-02-348
NM-02-380
NM-02-381
NM-02-382
NM-02-383
NM-02-496

A 106 Statement has been prepared in compliance with the National Historic Preservation Act of 1966. This document addresses impacts of the Proposed Action and alternatives on those sites determined eligible for the National Register. The SHPO has reviewed the affects of the Proposed Action and alternatives on the sites determined eligible for the National Register. His concurrence with the project design features and mitigating measures is documented in the 106 Statement. This can be reviewed at the Socorro District Office.

Future Environment

Trampling and rubbing impacts would continue as in the Existing Environment except for the 25 allotments with AMPs. There would be an increase of 1,886 acres (2 percent) in the number of slight erosion acres and a decrease of 1,820 acres (2 percent) in moderate erosion acres.

Surface disturbance related to range developments is expected on 8 of the 25 existing AMPs (Appendix 1, Table A-2, p. A-18). No known sites would be impacted from construction of these range developments.

Indirect impacts are those caused by secondary uses. For example, a road may avoid all sites, but it could provide better access to sites by vandals.

Impacts

DISTURBANCE

Grazing cattle disturb cultural resources by trampling and rubbing. Artifacts are chipped and broken; this type of modification is more significant for lithic than for ceramic artifacts. Structures are disturbed by cattle rubbing against them. This disturbance is difficult to quantify. Greatest disturbance would occur in areas of greatest cattle activity; these include watering areas and paths along fences.

The rate of soil erosion is related to erosion of sites. Analysis of the survey data shows that 40 percent of the sites are experiencing erosion. The rate of erosion varies from slight to severe. Of the sites experiencing erosion, 24 percent are in poor condition.

Table 2-34 shows the acres of various sediment yield classes in high site density areas. This involves about 217,000 acres of land in the Arroyo Colorado, Rio Salado, Rio Grande Valley, and Chupadera Wash - Jornada del Muerto areas. Only high site density areas were calculated because erosion's greatest impact would occur there. Soils in the severe sediment yield class are mostly river washes and badlands and are not likely to contain sites. (See Soils Section for more detail).

By disturbing the surface, construction of range developments would impact cultural resources occurring in the disturbed area. The degree of impacts is dependent on type of project and site density. For example, a pipeline going through a multi-component pueblo would have a greater impact than a fence. The same project would have less impacts if the site was an eroded campsite with only one occupation. Also, any project would have a greater chance of impacting a site in a high site density area.

A comparison of all proposed range developments and known sites was made. Table 1-4 shows the number of proposed projects and the acreage to be disturbed. Of the total projects shown in that table, 13 miles of pipeline, 27 miles of fence, and 80 acres around springs have been surveyed. No sites were found.

Indirect impacts are those caused by secondary uses. For example, a road may avoid all sites, but it could provide better access to sites by vandals.

Proposed Action - Trampling and rubbing would increase around the proposed 79 water troughs and 214 miles of fence. Also, while there would be an overall short-term reduction from 170,697 to 119,465 AUMs, the number of cattle in each pasture would generally increase over existing numbers due to the resting of pastures. The long-term increase to 173,916 AUMs would increase site damage, but the increased vegetation would add some protection. This would be a long-term, local impact.

There would be a 36-percent reduction in the number of critical sediment yield acres from the existing situation. There would be an increase of 52,041 acres (or 53 percent) in the slight erosion class. This would decrease the rate of erosion on sites. This would be a long-term, local impact. Based on present survey data no known sites would be directly impacted by developments. Future surveys may identify impacts. Also, there could be indirect impacts.

No Action Alternative - Trampling and rubbing impacts would continue as in the Existing Environment except for the 25 AMP allotments. On these allotments there could be a short-term decrease for this kind of disturbance resulting from a decrease from 170,697 to 159,025 AUMs, but increased cattle numbers per pasture would increase disturbance. Also, trampling and rubbing would increase near the proposed 18 water

troughs and 14 miles of fence. This would be a long-term, local impact.

There would be an increase of 1,886 acres (2 percent) in the number of slight sediment yield acres and a decrease of 1,820 acres (2 percent) in moderate sediment yield acres. This would be a long-term, local impact.

Based on present survey data, no known sites would be directly impacted from projects. Future surveys, however, may identify impacts. Also, there could be indirect impacts.

Livestock Adjustment Alternative - There would be increased trampling and rubbing adjacent to the proposed 18 water troughs and 14 miles of fences. Overall impacts from trampling and rubbing would decrease. There would be a sharp decrease with the short-term reduction from 170,697 to 119,465 AUMs followed by an increase to 165,736 AUMs. This would be a long-term, local impact.

There would be a 47-percent increase in slight sediment yield acres over the existing situation in high site density areas. Moderate and critical sediment yield classes would decrease 42 and 36 percent, respectively, from the existing situation. This would be a long-term, local impact.

Based on present survey data, no known sites would be directly impacted by construction of range developments. Future surveys, however, may identify impacts. Also, there could be indirect impacts.

Pasture Capacity Level Alternative - Trampling and rubbing would increase around the proposed 79 water troughs and 214 miles of fences. Short-term impacts would be reduced by a decrease in AUMs from 170,697 to 97,036. Long-term disturbance would increase above the existing situation as AUMs increase to 205,665. This is a long-term, local impact.

In the slight sediment yield class there would be a 58-percent increase (or 56,889 acres) over the existing situation. Moderate and critical sediment yield classes would decrease by 48 (43,749 acres) and 66 percent (13,761 acres), respectively, from the existing situation. This would be a long-term, local impact.

Based on present survey data, no known sites would be directly impacted by construction of range developments. Future surveys, however, may identify impacts. Also, there could be indirect impacts.

Enhancement of Sensitive Resource Values Alternative - Trampling and rubbing would increase around the proposed 79 water troughs and 241 miles of fence. With a decrease from 170,697 to 81,901 AUMs, trampling and rubbing impacts would also decrease. The long-term AUM number of 209,620 would mean increased trampling. This would be a long-term, local impact.

In the slight sediment yield class there would be a 58-percent increase (or 56,889 acres) over the existing situation. Moderate and critical sediment yield classes would decrease by 48 (43,749 acres) and 66 percent (13,761 acres), respectively, from the existing situation. This would be a long-term, local impact.

Based on present survey data, no known sites would be directly impacted by construction of range developments. Future surveys, however, may identify impacts. Also, there could be indirect impacts.

No Grazing Alternative - This would eliminate all trampling and rubbing impacts on public land due to cattle. This would be a long-term, local impact.

The stable sediment yield class would increase from the present zero acres to 58,651 acres. Soils in the slight sediment yield class would increase by 33 percent over the present situation. In the total high site density area 87 percent of the acres would be in stable and slight sediment yield classes. This would be a long-term, local impact.

There would be no direct or indirect impacts from construction of range developments.

CUMULATIVE IMPACTS

Proposed Action - Increased cattle numbers in the long term would increase trampling and rubbing; however, improved vegetation would add some protection. Erosion damage would decrease. No known sites would be impacted from construction of range developments but future surveys could identify sites that would be impacted.

No Action Alternative - On the existing 25 AMP allotments increased cattle numbers would increase trampling and rubbing; however, improved vegetation would add some protection. Erosion damage would decrease on these same allotments. No known sites would be impacted from construction of range developments; but future surveys could identify sites that would be impacted. Impacts on non-AMP allotments would continue at the existing situation.

Livestock Adjustment Alternative - Increased cattle numbers in the long term would increase trampling and rubbing; however, improved vegetation would add some protection. Erosion damage would decrease. No known sites would be impacted from construction of range developments, but future surveys could identify sites that would be impacted.

Pasture Capacity Level Alternative - Increased cattle numbers in the long term would increase trampling and rubbing; however, im-

proved vegetation would add some protection. Erosion damage would decrease. No known sites would be impacted from construction of range developments, but future surveys could identify sites that would be impacted.

Enhancement of Sensitive Resource Values Alternative - Increased cattle numbers in the long term would increase trampling and rubbing; however, improved vegetation would add some protection. Erosion damage would decrease. No known sites would be impacted from construction of range developments, but future surveys could identify sites that would be impacted.

No Grazing Alternative - Impacts from trampling and rubbing would be eliminated. Erosion damage would decrease. There would be no impacts from construction of range developments.

Mitigating Measures

Specific mitigating measures are to be identified in the site specific EARs if impacts are identified.

Unavoidable Adverse Impacts

It is expected that disturbance would occur as a result of trampling and erosion. Trampling impacts cannot be completely avoided if objectives are to be met. The effects of deterioration due to erosion would be reduced by an unknown amount but cannot be eliminated altogether.

Disturbance to subsurface sites not discovered during pre-construction surveys would be almost certain to occur. In cases where salvage is required, the impact would not be fully mitigated. Salvage of cultural resources is an unavoidable adverse impact. Once excavated, a site is effectively destroyed and removed from future research considerations which may utilize new techniques. Salvage is rarely as effective as non-salvage research programs, partially because of time limitations, funding, and personnel competence. Emergency salvage, required by unexpected discoveries during project initiations, would be even less effective.

Irreversible and Irretrievable

Proposed livestock grazing and development of facilities could disturb certain cultural resources. Once disturbed, historical and archaeological sites as well as artifacts would no longer be available for future study. This could result in a data gap in the history of an area and would be considered an irretrievable commitment.

Any excavation, damage, pot-hunting, or stripping done to any historical site or archaeological resource would be an irreversible and irretrievable commitment of these non-renewable resources.

RECREATION

Existing Environment

SIGHTSEEING

The 838,808 acres of public land in the ES Area possess a variety of scenic resources. Sightseeing opportunities range from birdwatching and wildlife observation to general landscape viewing. Sightseeing use of the area may occur as a singular recreation pursuit, but it generally accompanies recreation activities such as hunting, camping, hiking, picnicking, and photography. To provide a perspective for evaluation, the scenic resources of the ES Area were compared to those of a larger area. The area of comparison for the evaluation of the scenic resources is a 100-mile radius from Socorro (Map 2-11).

The ES Area has an interesting mix of scenic resources such as low-lying bosque lands, creosote terraces, grasslands, and high mesa-mountain topography (Figures 2-12, 2-13, and 2-14). One can experience the wide open spaces by driving east of Socorro on the Jornada del Muerto plains. The northwestern portion of the area with its rugged mesa tops, sandstone bluffs, and desert mountains contrasts markedly with the flat to rolling rangelands to the south and east. A unique, highly scenic, 3,200-acre yucca area, 20 miles south of NM 380, has been identified by BLM for protection (Figure 2-15).

Scenic geologic resources of the area include San Lorenzo Canyon, Petaca Pinta, Tecolote Badlands, the Box, the Rio Salado Canyons, Ladron Mountain, and Nogal Canyon (Map 2-12). For a more detailed evaluation and listing of the scenic resources, refer to Ladron and Stallion URAs.

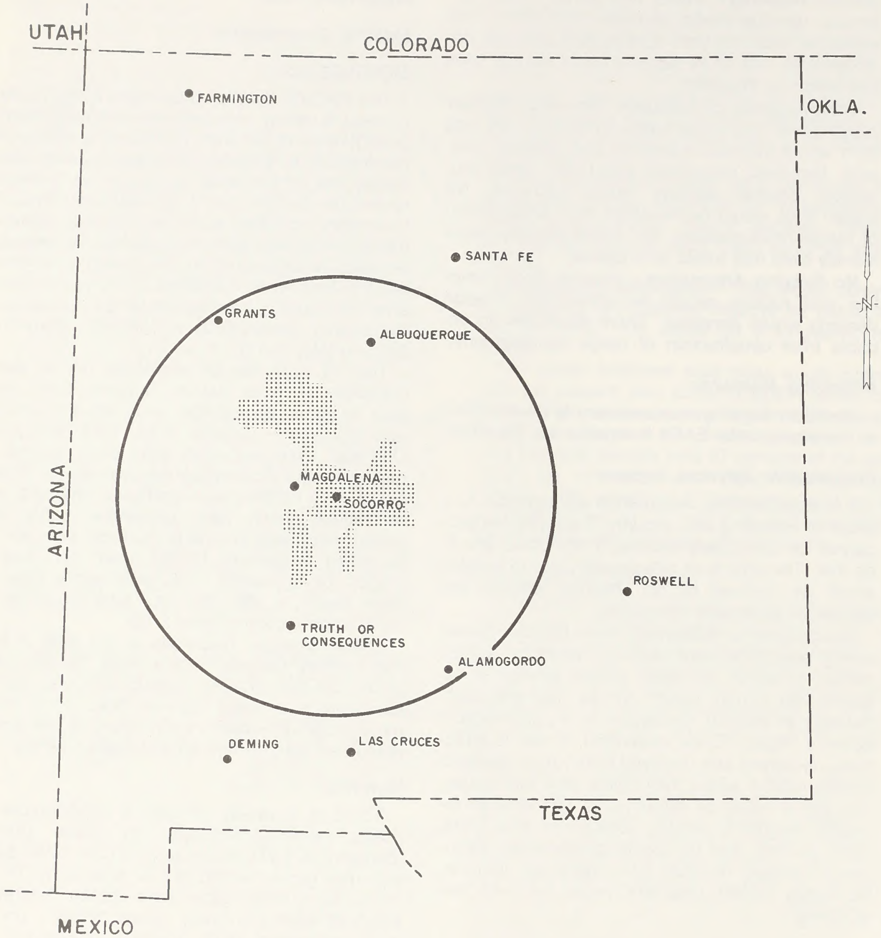
HUNTING

There is a variety of hunting opportunities on public lands. Estimated big game hunting 'demand' is 5,919 visitor days (Table 2-35). Existing small game hunting is estimated to be 13,306 visitor days. Small game hunting, the majority of which is dove and quail, occurs primarily on the open range and along bosque lands in the Rio Grande Valley.

A significant portion of big game hunting involves deer. The 1975 deer hunters in the ES Area totaled 2,146 (NMDG&F 1975 Performance Report). Several antelope hunts are conducted during specified years in designated areas. During 1977, for example, NMDG&F issued 86 antelope permits on 8 allotments in the ES Area.

ORV USE

The majority of ORV use is on private, State, and scattered parcels of public land that comprise



Area of Comparison

(Source - BLM Socorro District Files)

MAP 2-11. Area of Comparison for Scenic Quality Evaluations

Figure 2-12. Creosote terraces

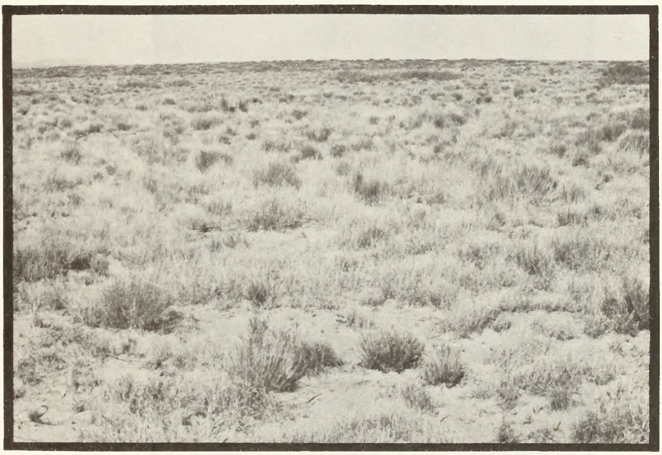


Figure 2-13. Grasslands

Figure 2-14. Mesa mountain topography

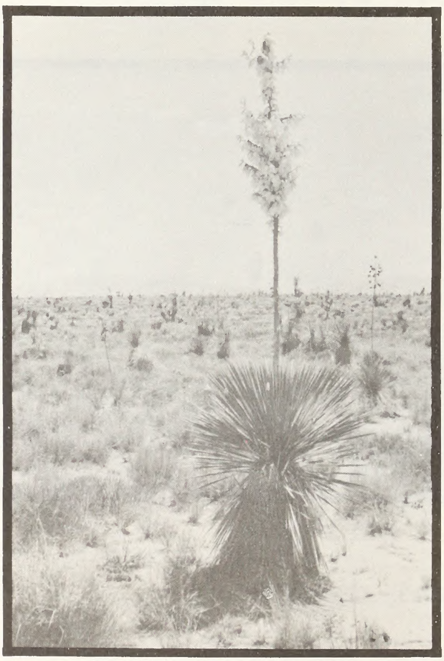
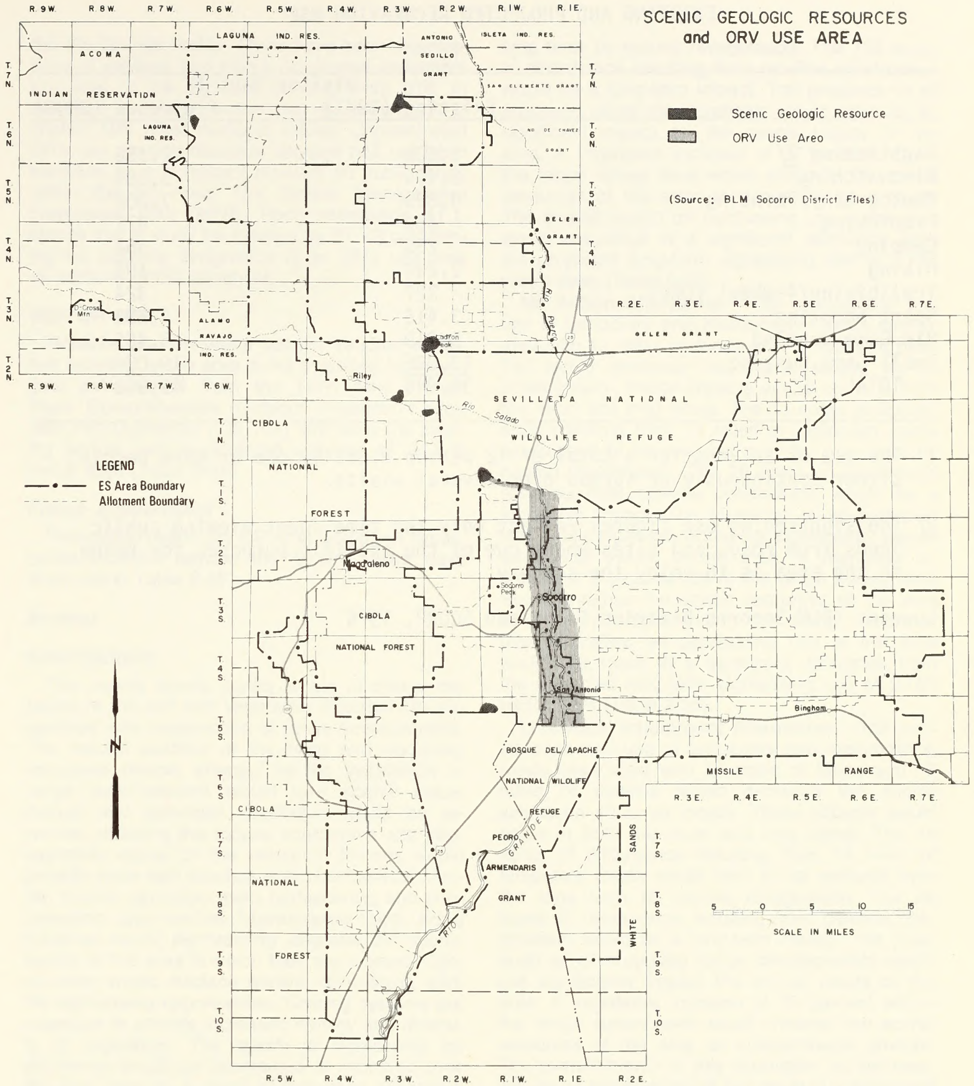


Figure 2-15. Scenic yucca area



MAP 2-12. Scenic Geologic Resources and ORV Use Area

TABLE 2-35

EXISTING AND PROJECTED RECREATION USE

	Visitor Days 1/	
	Existing (1977)	Projected (2000)
Sightseeing 2/	1,508	2,156
Birdwatching	2,499	3,503
Photography/Painting	4,899	7,006
Picnicking	683	977
Camping	255	364
Hiking	2,234	3,195
Trailbiking/4-wheel (ORV)	227	324
Sport Shooting	3,416	4,885
Big Game Hunting	5,919	8,465
Small Game Hunting	13,306	19,028
TOTAL	34,946	49,903

1/ The use of an area for a total of 12 person hours by one or more people, either continuously or spread over several visits.

2/ The sightseeing use figures reflect only the time spent viewing public lands from roads and sites where one of the specific purposes for being in the area is to enjoy the scenery.

Source: BLM Socorro District Files and SCORP, 1976

the Rio Grande Valley. There have been observations of vehicles and tracks on several allotments just east of the Rio Grande. Allotment 318, in particular, receives frequent use yet not enough to conflict with other resource values. Concentrated ORV use causing resource damage has not been identified as a significant problem on public lands within the ES Area. The Stallion Management Framework Plan (MFP), Recommendation 11.1, directs that a study be initiated by FY 78 concerning the possible designation of an ORV use area on portions of this allotment.

VISITOR USE

Reliable data on visitor use for various recreation activities in the area is not available; however, data extrapolated from the 1976 New Mexico State Comprehensive Outdoor Recreation Plan (SCORP) (Appendix 7, p. 104) estimates the existing annual use for selected activities at 34,946 visitor days (Table 2-35).

Future Environment

Recreation use in the ES Area would not significantly increase beyond the 49,903 visitor days projected in Table 2-35.

Impacts

SIGHTSEEING

The overall scenic quality would decrease because of the soil and vegetative disturbances associated with construction of range developments. The natural qualities of the living and non-living resources directly affected by the installation of range developments would lose scenic value. Annual and perennial vegetation would be removed, reducing the natural interpretive and photographic values of the resource. Fences would provide more bird perches and small animal habitat, thereby providing more birdwatching and photographic opportunities. Maintenance roads along pipelines would permanently degrade the scenic quality of the area in which they are located. Construction would displace wildlife, diminishing wildlife sightseeing opportunities. Grazing systems are expected to provide increased density and diversity of vegetation. The quality of sightseeing on allotments would be maintained or improved over the long term as a result of increased vegetative production.

Proposed Action - The construction and use of temporary and maintenance roads associated with 214 miles of fence and 89 miles of pipeline would decrease the scenic values locally on 347 acres in the short term. The 214 acres of disturbance resulting from 214 miles of temporary roads would be approximately 80-percent restored over the long term by natural revegetation. The 133 acres of disturbance resulting from pipeline construction would be a long-term impact. The presence of all proposed range developments would have an insignificant impact on the scenic values of the area. A vegetative increase of 37 percent above the range survey level would enhance the scenic resources of the area an unquantifiable amount. The overall impact on sightseeing use in the area would not result in a significant difference from the projected long-term sightseeing use of 2,156 visitor days (Table 2-35).

No Action Alternative - The construction and use of temporary and maintenance roads associated with 14 miles of fence and 17 miles of pipeline would decrease the scenic values on 40 acres locally. These impacts would occur in both the short and long terms. The 14 acres of disturbance resulting from 14 miles of temporary roads would tend to be restored over the long term by natural revegetation. The 26 acres of disturbance resulting from pipeline construction would be a long-term impact. The presence of all proposed range developments would not significantly impact the scenic values of the area. A vegetative increase of 9 percent above the range survey level would enhance the scenic resources of the area an unquantifiable amount. The overall impact of this alternative on sightseeing use in the area would not result in a significant difference from the projected long-term sightseeing use of 2,156 visitor days (Table 2-35).

Livestock Adjustment Alternative - The construction and use of temporary and maintenance roads associated with 14 miles of fence and 17 miles of pipeline would decrease the scenic values on 40 acres locally. These impacts would occur in both the short and long terms. The 14 acres of disturbance resulting from 14 miles of temporary roads would tend to be restored over the long term by natural revegetation. The 26 acres of disturbance resulting from pipeline construction would be a long-term impact. The presence of all proposed range developments would not significantly impact the scenic values of the area. A vegetative increase of 30 percent above the range survey level would enhance the scenic resources of the area an unquantifiable amount. The overall impact of this alternative on sightseeing use in the area would not result in a significant difference from the projected long-term sightseeing use of 2,156 visitor days (Table 2-35).

Pasture Capacity Level Alternative - The construction and use of temporary and maintenance roads associated with 214 miles of fence and 89 miles of pipeline would decrease the scenic values locally on 347 acres in the short term. The 214 acres of disturbance resulting from 214 miles

of temporary roads would be approximately 80-percent restored over the long term by natural revegetation. The 133 acres of disturbance resulting from pipeline construction would be a long-term impact. The presence of all proposed range developments would have an insignificant impact on the scenic values of the area. A vegetative increase of 61 percent above the range survey level would enhance the scenic resources of the area an unquantifiable amount. The overall impact on sightseeing use in the area would not result in a significant difference from the projected long-term sightseeing use of 2,156 visitor days (Table 2-35).

Enhancement of Sensitive Resource Values Alternative - The impacts to scenic quality and sightseeing use in the area from this alternative would not significantly differ from those occurring under the Proposed Action, because the number of range developments has increased by only 26 miles of fence. The construction and use of temporary and maintenance roads associated with 241 miles of fence and 89 miles of pipeline would decrease the scenic values locally on 133 acres in the short term. The 241 acres of disturbance resulting from the construction of fences would be approximately 80-percent restored over the long term by natural revegetation. In the long term 89 acres of disturbance resulting from pipeline construction would persist. A vegetative increase of 64 percent above the range survey level would enhance scenic values an unquantifiable amount. The overall impact on sightseeing use in the area would not result in a significant difference from the projected long-term sightseeing use of 2,156 visitor days (Table 2-35).

No Grazing Alternative - The scenic values of the area would be diminished by the construction of 1,475 miles of fence on private lands. Access across private lands may be restricted; thereby, decreasing sightseeing use in the area. The impacts on sightseeing use would be local and long term. However, sightseeing use would not significantly differ from the projected use of 2,156 visitor days (Table 2-35).

HUNTING

Improved access for hunting would result from new temporary and maintenance roads associated with new range developments. The slight increase projected under the Proposed Action and alternatives for wildlife populations would not be sufficient to meet the projected demands of 27,493 visitor days (Table 2-35). Therefore, the quality of hunting in the area would decrease with or without the Proposed Action or alternatives.

Proposed Action - Antelope numbers would increase from 648 to 763 in the long term. Deer numbers would remain at 1,333. Small game would increase an unquantifiable amount in the long term. The overall hunting use would not significantly differ from the long-term projections of 27,493 visitor days (Table 2-35).

No Action Alternative - Antelope numbers would increase from 648 to 665 in the long term. Deer numbers would remain at 1,333. Small game would increase an unquantifiable amount in the long term. The overall hunting use would not significantly differ from the long-term projections of 27,493 visitor days (Table 2-35).

Livestock Adjustment Alternative - Antelope numbers would increase from 648 to 712 in the long term. Deer numbers would remain at 1,333. Small game would increase an unquantifiable amount in the long-term. The overall hunting use would not significantly differ from the long-term projections of 27,493 visitor days (Table 2-35).

Pasture Capacity Level Alternative - Antelope numbers would increase from 648 to 773 in the long term. Deer numbers would remain at 1,333. Small game would increase an unquantifiable amount in the long term. The overall hunting use would not significantly differ from the long-term projections of 27,493 visitor days (Table 2-35).

Enhancement of Sensitive Resource Values Alternative - Antelope numbers would increase from 648 to 779 in the long term. Deer numbers would remain at 1,333. Small game would increase an unquantifiable amount in the long term. The overall hunting use would not significantly differ from the long-term projections of 27,493 visitor days (Table 2-35).

No Grazing Alternative - Antelope numbers would increase from 648 to 720 in the long term. Deer numbers would remain at 1,333. Small game would increase an unquantifiable amount in the long term. The overall hunting use would not significantly differ from the long-term projections of 27,493 visitor days (Table 2-35). Hunting use may be limited if private landowners restrict access across their lands. This would prevent entry to some public lands.

ORV USE

ORV use areas would increase as a result of the additional temporary and maintenance roads. Continued use of roads for fence and pipeline maintenance would encourage ORV use. The projected increase in recreational use (Table 2-35) would result in additional unquantified ORV use.

Proposed Action - The vehicle tracks created during the construction of 214 miles of fence would encourage ORV use in the short term. The periodic and continual use of 89 miles of new roads for pipeline maintenance would provide for an increase in short- and long-term ORV use.

These impacts would be local and would not be a significant increase beyond the long-term projections of 324 visitor days (Table 2-35).

No Action Alternative - The vehicle tracks created during the construction of 14 miles of fence would encourage ORV use in the short term. The periodic and continual use of 17 miles of new roads for pipeline maintenance would provide for an increase in short- and long-term ORV use. These impacts would be local and would not be a significant increase beyond the long-term projections of 324 visitor days (Table 2-35).

Livestock Adjustment Alternative - The vehicle tracks created during the construction of 14 miles of fence would encourage ORV use in the short term. The periodic and continual use of 17 miles of new roads for pipeline maintenance would provide for an increase in short- and long-term ORV use. These impacts would be local and would not be a significant increase beyond the long-term projections of 324 visitor days (Table 2-35).

Pasture Capacity Level Alternative - The vehicle tracks created during the construction of 214 miles of fence would encourage ORV use in the short term. The periodic and continual use of 89 miles of new roads for pipeline maintenance would provide for an increase in short- and long-term ORV use. These impacts would be local and would not be a significant increase beyond the long-term projections of 324 visitor days (Table 2-35).

Enhancement of Sensitive Resource Values Alternative - The vehicle tracks created during the construction of 241 miles of fence would encourage ORV use in the short term. The periodic and continual use of 89 miles of new roads for pipeline maintenance would provide for an increase in short- and long-term ORV use. These impacts would be local and would not be a significant increase beyond the long-term projections of 324 visitor days (Table 2-35).

No Grazing Alternative - The vehicle tracks created during the construction of 1,475 miles of fence would encourage ORV use in the short term. Access to public land may be restricted if private landowners deny access across their lands.

CUMULATIVE IMPACTS

Proposed Action - The overall impact on sightseeing, hunting, and ORV use would not result in significant differences from long-term projections in Table 2-35.

No Action Alternative - There would be no discernible impact on recreation use. Recreation use would continue at the existing and projected levels (Table 2-35). The overall impact of this alternative on recreation use would be insignificant.

Livestock Adjustment Alternative - The overall impact on sightseeing, hunting, and ORV use would not result in significant differences from long-term projections in Table 2-35.

Pasture Capacity Level Alternative - The overall impact on sightseeing, hunting, and ORV use would not result in significant differences from those long-term projections in Table 2-35.

Enhancement of Sensitive Resource Values Alternative - The overall impact on sightseeing, hunting, and ORV use would not result in a significant difference from the long-term projections in Table 2-35.

No Grazing Alternative - The overall impact on sightseeing, hunting, and ORV use would not result in a significant difference from the long-term projections in Table 2-35.

Unavoidable Adverse Impacts

During the construction of range developments, and for a short time thereafter, sightseeing values would be diminished near soil and vegetative disturbances. Natural sightseeing values would be impaired to a minor degree by the continued presence of range developments.

VISUAL RESOURCES

Existing Environment

VISUAL RESOURCE MANAGEMENT SYSTEM

BLM has implemented a visual inventory and analysis process to provide for a systematic interdisciplinary approach in the management of aesthetic values on public lands. Visual resource management (VRM) is integrated into BLM's Planning and Environmental Systems to implement resource management activities while minimizing adverse impacts to the visual resources. The VRM system inventories existing scenic quality and assigns visual management categories based on a combination of scenic values, visual sensitivity, and viewing distance zones. This provides for a systematic visual evaluation of proposed resource management activities to ensure they meet the visual quality of the landscape on which they occur (Appendix 8, p. A-106).

VISUAL RESOURCE MANAGEMENT CLASSES

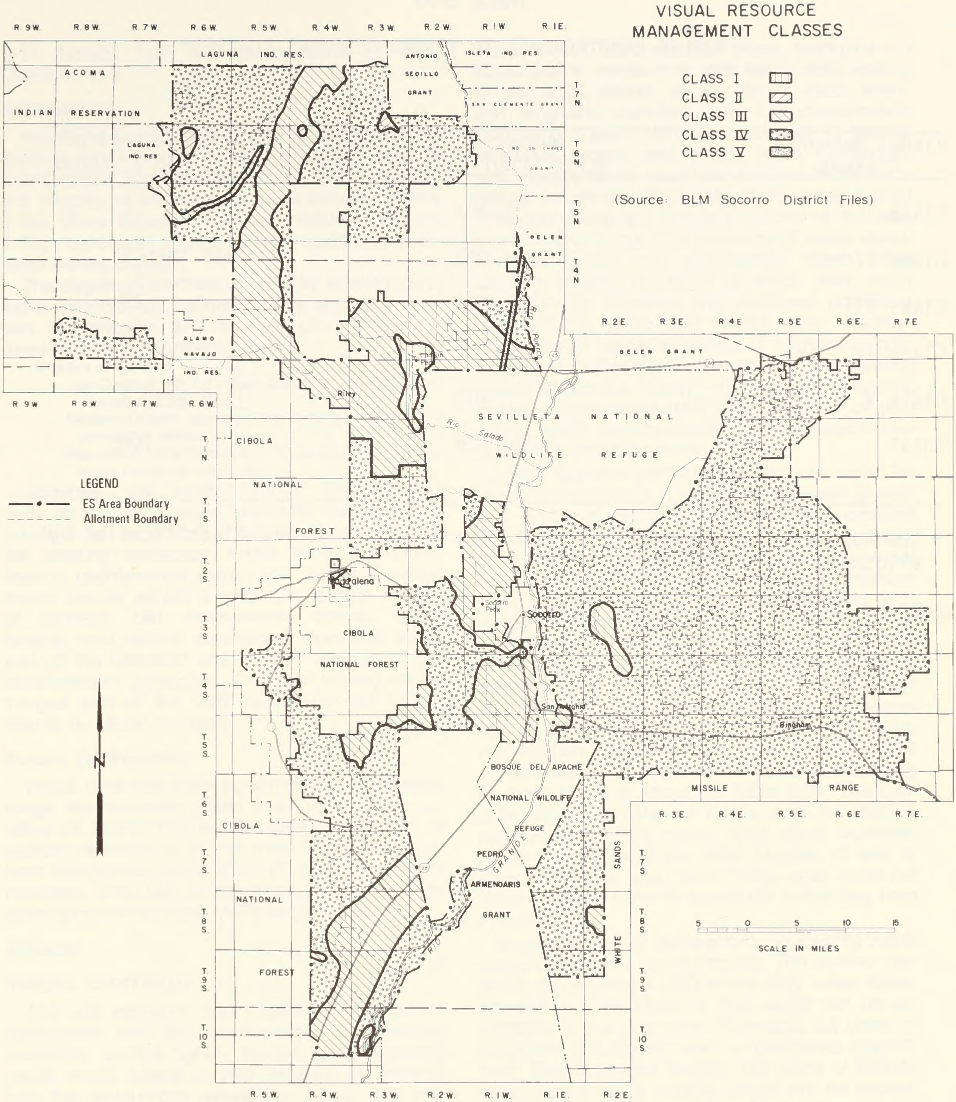
BLM has five VRM classes (Table 2-36) to provide guidance in ascertaining the degree of modification acceptable to the landscape affected by proposed management activities. Map 2-13 shows the distribution of all VRM classes in the ES Area. Most of the public lands (98 percent) in the ES Area are Classes III and IV (Table 2-37). Figures

TABLE 2-36

VISUAL RESOURCE MANAGEMENT CLASSES

Class I	-	This class primarily provides for natural ecological changes only. It is applied to primitive areas, some natural areas, and other similar situations where management activities are to be restricted.
Class II	-	Changes in any of the basic elements (form, line, color, or texture) caused by a management activity should not be evident in the characteristic landscape.
Class III	-	Changes in the basic elements (form, line, color, texture) caused by a management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.
Class IV	-	Changes may subordinate the original composition and character but must reflect what could be a natural occurrence within the characteristic landscape.
Class V	-	Change is needed. This class applies to areas where the naturalistic character has been disturbed to a point where rehabilitation is needed to bring it back into character with the surrounding countryside. This class would apply to areas identified in the scenery evaluation where the quality class has been reduced because of unacceptable intrusions. It should be considered an interim short-term classification until one of the other objectives can be reached through rehabilitation or enhancement. The desired visual quality objective should be identified.

Source: BLM Manual 6310.18



MAP 2-13. Visual Resource Management Classes

TABLE 2-37

PUBLIC LAND ACREAGE IN VISUAL RESOURCE CLASSES*

Visual Resource Classes	Number of Acres (Public Land)	Percent of Public Lands
Class I	9,040	1
Class II	2,880	less than 1
Class III	258,706	29
Class IV	567,782	69
Class V	400	less than 1
Total	838,808	100

* See Appendix 8, Table A-40, p. A-113, for visual resource classification by allotment.

Source: BLM Socorro District Files

2-16 through 2-21 are representative of VRM Classes I to V.

INTRUSIONS

Intrusions associated with 100 years of livestock grazing, stock ponds, fences, windmills, storage tanks, roads, and buildings (Figure 2-21) produce the majority of the existing visual impacts (Table 2-38). Other intrusions include powerlines (Figure 2-20), microwave towers, oil drill pads, and scattered mining claims.

The degree of contrast created by existing intrusions depends on various factors such as location, rehabilitation, and materials used. There are three degrees of contrast.

Degrees of Contrast

Low-Contrast will not attract attention from landscape character.

Medium-Attracts attention and begins to dominate landscape character.

High-Demands attention, will not be overlooked, dominates landscape character.

Generally, the existing range developments such as fences, troughs, windmills, springs, etc., create a low to moderate degree of contrast with the existing landscape. Utility lines, microwave towers, maintenance roads, and mining developments usually exhibit a moderate to high degree of contrast. Old homesteads, corrals, ranch houses, and various abandoned structures are a part of the historical and cultural heritage of the southwestern landscape. They are viewed as an integral part of the total landscape and create little to no visual contrast.

Future Environment

Visual contrasts from construction of proposed range developments would occur on 8 of the existing 25 AMPs. This would result in 90 acres of surface disturbance in the short term. The long-term disturbance would affect 67 acres. The visual contrasts from the structural presence of range developments on eight AMPs would be minor.

Impacts

VISUAL CONTRAST

The soil exposure and vegetative disturbance associated with the construction of pipelines, windmills, storage tanks, fences, and temporary roads would create varying degrees of contrast with the surrounding natural landscape. Any erosion resulting from these disturbances would tend to emphasize the contrasts. The number of acres disturbed, contrast rating, and acceptability of these developments to the VRM classes in which they occur is shown in Table 2-39. Soil exposure, initiated during construction of water troughs and the earthen reservoir, would be perpetuated by the concentration of cattle around the water developments. These sacrifice areas, averaging 2.5 acres and in conjunction with cattle trails leading to and from waters, create strong, local, short- and long-term contrasts with the characteristic landscape (Table 2-39). The presence of fences, windmills, springs and wildlife water exclosures, and storage tanks would be artificial forms on a natural landscape. These structures would not be in harmony with the natural character of the area in which they occur. The presence of water developments would not significantly affect VRM Classes III and IV Areas in which they occur (Table 2-39). However, the proposed protective fencing of a spring and wildlife water developments would cause a growth of vegetation contrasting in color and form to the surrounding desert landscape. Taken in the context of existing range developments, the visual impacts of proposed range developments on the characteristic landscape would be minor.

Under the new grazing systems there would be some local contrast in vegetation between grazed and ungrazed pastures (Table 2-39). Increased ground cover and plant community diversity resulting from these systems would improve the visual aspects of the range. The amount of exposed soils and erosion would tend to decrease with improved range condition.

Proposed Action - The construction of water developments would create a short-term, local disturbance of 365 acres in VRM Classes III and IV Areas. Vegetative and soil disturbance caused by 214 miles of temporary roads created during construction of fences would have a local impact on the visual environment. The visual acceptability of these roads is shown in Table 2-39. The construction of 89 miles of roads used for pipeline maintenance would create local visual contrasts which do not meet the VRM Classes III and IV standards in the short term. These also would not meet the VRM Class III standards in the long term (Table 2-39).

Installation of 22 cattleguards on existing roads would have minor visual impacts. The earthen reservoir (on allotment 290) is the only water development in VRM Class IV that would not be acceptable in the long term. This totals 0.5 acres of long-term disturbance and is considered insignificant. Sacrifice areas totaling 198 acres of disturbance around water troughs would not be acceptable to VRM Classes III and IV standards in the short and long terms.

No Action Alternative - Visual contrasts from construction of range developments would occur on 8 of the existing 25 AMPs. This would result in 90 acres of surface disturbance in the short term. The long-term disturbance would affect 67 acres. The visual contrasts from the presence of range

Figure 2-16. Ladron Mountain - 7,000 feet elevation
Example of VRM Class I

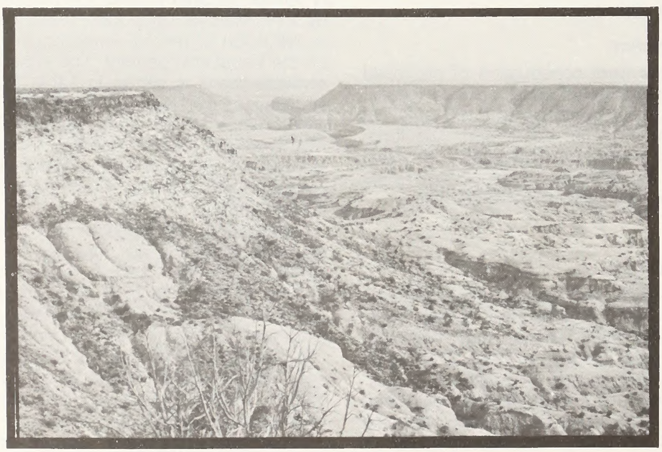


Figure 2-17. Tecolote Badlands
Example of VRM Class II

Figure 2-18. Coarse texture/broken line
Example of VRM Class III

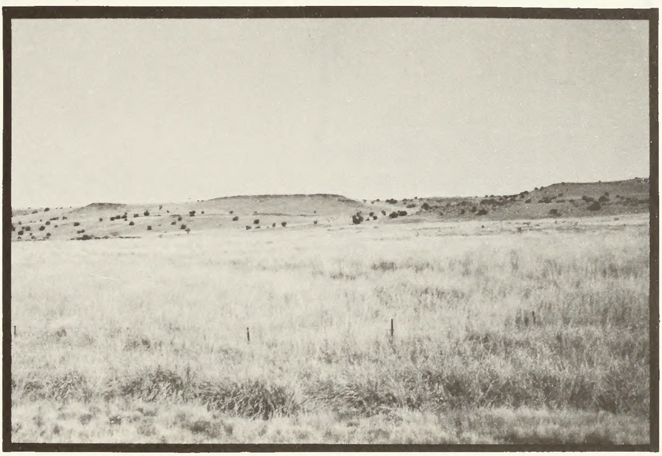


Figure 2-19. Jornada del Muerto
Example of VRM Class IV

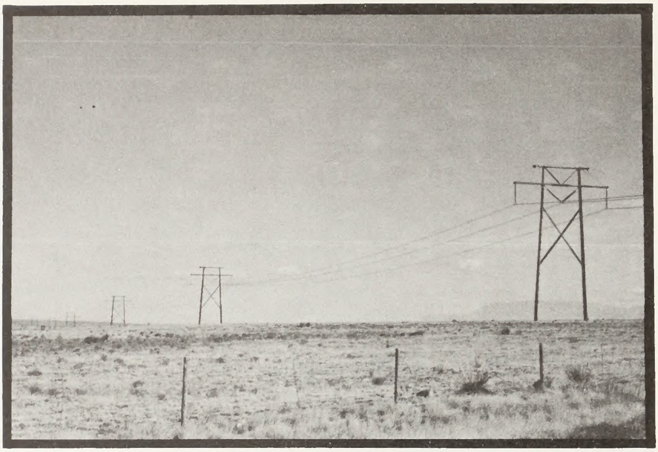


Figure 2-20. Intrusions - Powerlines
Example of VRM Class V

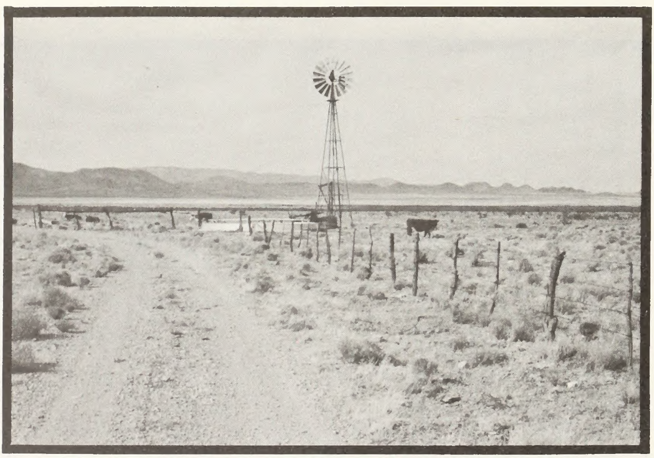


Figure 2-21. Intrusions associated with grazing

TABLE 2-38

EXISTING RANGE DEVELOPMENTS ASSOCIATED
WITH 100 YEARS OF LIVESTOCK GRAZING

	Units	Total Units	Existing Number of Acres Disturbed Long-Term
Fence	Miles	1,524	305
Cattleguards	Each	28	2
Wells	Each	214	21
Springs	Each	59	3
Pipelines	Miles	276	28
Storage Tanks	Each	44	4
Troughs	Each	349	28
Wildlife Waters	Each	46	2
Earthen Reservoirs	Each	331	166
Total Acres Disturbed			559

Source: BLM Socorro District Grazing Files

TABLE 2-39

IMPACTS BY VISUAL RESOURCE CLASSES

	Proposed Units	No. of Acres Affected (Short Term) /1	Contrast Rating	Acceptable	No. of Acres Affected (Long Term) /1	Contrast Rating	Acceptable
Class I Impacts							
Grazing Systems	All	9,760.00	6	Yes	9,760.00	6	Yes
Class II Impacts							
Grazing Systems	All	6,364.00	6	Yes	6,364.00	6	Yes
Class III Impacts							
Fences (Mi.) /2	35.7	35.70	23	No	7.14	12	Yes
Cattleguards (No.)	4.0	5.20	15	Yes	5.20	15	Yes
Troughs (No.) /3	16.0	40.00	22	No	40.00	21	No
Storage Tanks (No.)	6.0	3.00	16	Yes	0.60	9	Yes
Wells (No.)	3.0	1.50	15	Yes	0.30	11	Yes
Springs (No.)	1.0	0.20	15	Yes	0.05	11	Yes
Wildlife Waters (No.)	7.0	0.80	15	Yes	0.35	11	Yes
Pipelines (Mi.) /2	13.4	20.10	23	No	13.40	19	No
Grazing Systems	All	312,294.00	6	Yes	312,294.00	6	Yes
Class IV Impacts							
Fences (Mi.) /2	178.5	178.50	24	No	35.70	12	Yes
Cattleguards (No.)	18.0	0.11	15	Yes	0.11	15	Yes
Earthen Reservoirs (No.)	1.0	1.00	22	No	0.50	22	No
Troughs (No.) /3	63.0	157.50	22	No	157.50	21	No
Storage Tanks	35.0	17.50	16	Yes	3.50	11	Yes
Wells (No.)	13.0	6.50	15	Yes	1.30	11	Yes
Springs (No.)	3.0	0.60	13	Yes	0.15	16	Yes
Wildlife Waters (No.)	41.0	4.10	13	Yes	2.05	16	Yes
Pipelines (Mi.) /2	75.3	112.95	24	No	75.30	19	Yes
Grazing Systems	All	935,418.00	6	Yes	935,418.00	6	Yes
Class V Impacts							
Grazing Systems	All	3,600.00	6	Yes	3,600.00	6	Yes

/1 Acres disturbed is for AMP allotments and includes all lands (public, State, and private).
/2 Acres disturbed relating to fences and pipelines include temporary and maintenance roads.
/3 Acres disturbed relating to troughs includes sacrifice areas (2.5 acres per trough).

Source: BLM Socorro District Files

developments on eight AMPs would be minor (Table 2-40).

Livestock Adjustment Alternative - Visual contrasts from construction of range developments would occur on 8 of the existing 25 AMPs. This would result in 90 acres of surface disturbance in the short term. The long-term disturbance would affect 67 acres. The visual contrasts from the presence of range developments on eight AMPs would be minor (Table 2-40).

Pasture Capacity Level Alternative - The construction of water developments would create a short-term, local disturbance of 365 acres in VRM Classes III and IV Areas. Vegetative and soil disturbance caused by 214 miles of temporary roads created during construction of fences would have a local impact on the visual environment. The visual acceptability of these roads is shown in Table 2-40. The construction of 89 miles of roads used for pipeline maintenance would create local visual contrasts which do not meet the VRM Class III and IV standards in the short term. These also would not meet the VRM Class III standards in the long term (Table 2-40).

Installation of 22 cattleguards on existing roads would have minor visual impacts. The earthen reservoir (on allotment 290) is the only water development in VRM Class IV that would not be acceptable in the long term. This totals 0.5 acres of long-term disturbance and is considered insignificant. A slight decrease in vegetative contrast between grazed and ungrazed pastures would occur. Sacrifice areas totaling 198 acres of disturbance around water troughs would not be acceptable to VRM Classes III and IV standards in the short and long terms.

Enhancement of Sensitive Resource Values Alternative - The visual impacts created under the Enhancement of Sensitive Resource Values Alternative would be slightly more than those under the Proposed Action. The construction of water developments would create a short-term, local disturbance of 365 acres in VRM Classes III and IV Areas. Vegetative and soil disturbance caused by 241 miles of temporary roads created during construction of fences would have a local impact on the visual environment. The visual acceptability of these roads is shown in Table 2-40. The construction of 89 miles of roads used for pipeline maintenance would create local visual contrasts which do not meet the VRM Classes III and IV standards in the short term. These also would not meet the VRM Class III standards in the long term (Table 2-40).

Installation of 22 cattleguards on existing roads would have minor visual impacts. The earthen reservoir (on allotment 290) is the only water development in VRM Class IV that would not be acceptable in the long term. This totals 0.5 acres and is considered insignificant. Sacrifice areas totaling 198 acres of disturbance around water troughs would not be acceptable to VRM Classes III and IV standards in the short term and would persist over the long term. A reduction of visual impacts would result from a decrease in vegetative and soil erosion contrasts over the long term. The reduction in visual impacts from this alternative would not be significant.

No Grazing Alternative - The 1,475 miles of required new fencing would follow legal boundaries and be installed by private landowners. There would be no BLM control over the visual impacts of range developments installed on private lands. Vegetative contrasts would be emphasized where ungrazed public lands are intermixed or adjacent to the private lands (Table 2-40).

CUMULATIVE IMPACTS

Proposed Action - In the long term only the visual impacts from the earthen reservoir would not meet VRM Class IV standards. Pipeline maintenance roads would not meet the VRM Class III standards in which they occur over the long term.

No Action Alternative - In the long term only the visual impacts from pipeline maintenance roads would not meet the VRM Class III standards.

Livestock Adjustment Alternative - In the long term only the visual impacts from pipeline maintenance roads would not meet the VRM Class III standards.

Pasture Capacity Level Alternative - In the long term only the visual impacts from the earthen reservoir would not meet VRM Class IV standards. Pipeline maintenance roads would not meet the VRM Class III standards in which they occur.

Enhancement of Sensitive Resource Values Alternative - In the long term the visual impacts from the earthen reservoir would not meet the VRM Class IV standards. Pipeline maintenance roads would not meet the VRM Class III standards in which they occur.

No Grazing Alternative - The 1,475 miles of required new fencing would follow legal boundaries and be installed by private landowners. There would be no construction impacts on public lands. Vegetative contrasts would be emphasized where ungrazed public lands are intermixed or adjacent to the private lands.

The long-term soil and vegetative disturbances accompanying the construction of 1,475 miles of fence would not be acceptable to the VRM Classes III and IV in which they occur.

TABLE 2-40

SUMMARY OF VISUAL RESOURCE IMPACTS

	Grazing Systems				Range Developments			
	Average Contrast Rating	VRM Acceptability			Average Contrast Rating	VRM Acceptability		
		Class II	Class III	Class IV		Class II	Class III	Class IV
Existing Environment	10	Yes	Yes	Yes	16	No	Yes	Yes
Proposed Action	6	Yes	Yes	Yes	17	None	No	Yes
No Action Alternative/ Future Environment	10	Yes	Yes	Yes	16	No	Yes	Yes
Livestock Adjustment Alternative	6	Yes	Yes	Yes	16	None	Yes	Yes
Pasture Capacity Level Alternative	6	Yes	Yes	Yes	17	None	No	Yes
Enhancement of Sensitive Resource Values Alternative	5	Yes	Yes	Yes	16	None	Yes	Yes
No Grazing Alternative	23	No	No	Yes	23	No	No	No

Source: BLM Socorro District Files

Unavoidable Adverse Impacts

The visual constrast of 339 acres due to soil and vegetative disturbances resulting from the construction and maintenance of range developments would persist over the long term. The presence of sacrifice areas around livestock waters would create long-term visual contrasts averaging 2.5 acres per trough. Eighty-nine (89) miles of maintenance roads would persist as long-term intrusions on the visual environment. Fences would not be totally screened by vegetation or land forms and would persist as artificial intrusions. Windmills and water troughs would still exist as artificial structures on the natural landscape. The presence of range developments would persist as visual contrasts. Visual contrasts would continue to exist in varying degrees between grazed and ungrazed pastures as a result of the grazing systems.

Irreversible and Irretrievable

Any disturbance to surface soil or rock colors, erosion patterns, or geologic features which would leave a permanent scar on the landscape is considered to be irreversible.

WILDERNESS

Existing Environment

BLM was given wilderness designation and management responsibilities by Section 603 of the Federal Land Policy and Management Act (FLPMA). Guidance and procedures for BLM's relatively new wilderness program are currently being formulated. Pending the emergence of definitive manuals and regulations, BLM has issued interim guidance for the identification and management of potential wilderness areas. The initial step required of each BLM District is the identification of all wilderness inventory units. Once identified, these wilderness inventory units would be subject to a wilderness characteristic inventory. Those wilderness inventory units meeting certain minimum wilderness criteria would become Wilderness Study Areas. These Wilderness Study Areas would then be subject to additional criteria to determine suitability, in whole or in part, for wilderness designation. Wilderness inventory units that fail to meet minimum wilderness criteria would be eliminated from further consideration in the wilderness review process.

The District has tentatively identified 31 wilderness inventory units within the ES Area. These wilderness inventory units contain a total of approximately 400,000 acres, encompassing all or part of 58 allotments (Appendix 9, p. A-116). The wilderness inventory units have a broad variety of topography and vegetation. The varied environment of the wilderness inventory units includes lava flows (Malpais), short-grass rangelands, riparian bosque lands, lava-capped mesas, and rugged desert mountains.

Of special wilderness significance is Ladron Mountain. Approximately 18,000 acres of Ladron Mountain have been identified as a potential Wilderness Study Area. Prior to BLM's gaining wilderness designation authority under FLPMA, portions of Ladron Mountain had been studied for primitive area designation (Manthey, 1976).

Future Environment

The wilderness identification and evaluation process would continue as required by Section 603 of FLPMA and existing BLM guidelines.

Impacts

WILDERNESS VALUES

The present wilderness guidelines do not allow any proposed or existing actions on public lands that would impair their suitability for wilderness. Proposed grazing systems do not significantly affect existing wilderness values. Range developments associated with implementation of grazing systems would be delayed, modified, or eliminated pending clearance through the application of wilderness criteria.

The 31 tentatively identified wilderness inventory units would be inventoried and evaluated for wilderness characteristics prior to implementation of any new BLM action affecting these units. Some of these wilderness inventory units would be eliminated from further wilderness consideration following evaluation. Those units that are identified as having wilderness characteristics would become wilderness study areas. These study areas would be subject to evaluation by BLM's wilderness guidelines as applied through the planning system.

All existing multiple uses and supporting activities would be allowed to continue in the 31 identified wilderness inventory units 'to the degree and manner in which the same was being conducted on the date of approval of this Act' (FLPMA, 1976, Sec. 603c). New uses or expanded existing uses would be allowed if the impacts would not impair the suitability of the unit for wilderness consideration. The improved vegetative response in the long term would enhance the wilderness characteristics of the affected wilderness inventory units.

Proposed Action - All proposed range developments and grazing systems would be subject to the wilderness guideline constraints. No significant impacts are anticipated. Implementation of the new AMPs or modification of the 25 existing AMPs may be delayed or modified on 58 allot-

ments occurring in the 31 wilderness inventory units.

No Action Alternative - All proposed range developments and grazing systems would be subject to the wilderness guideline constraints. No significant impacts are anticipated. Any proposed projects or changes in grazing systems on the 25 existing AMPs may be delayed or modified on 21 allotments occurring in the 31 wilderness inventory units.

Livestock Adjustment Alternative - All proposed range developments and grazing systems would be subject to the wilderness guideline constraints. No significant impacts are anticipated. Any proposed projects or changes in grazing systems on the 25 existing AMPs may be delayed or modified on 21 allotments occurring in the 31 wilderness inventory units.

Pasture Capacity Level Alternative - All proposed range developments and grazing systems would be subject to the wilderness guideline constraints. No significant impacts are anticipated. Implementation of the new AMPs or modification of the 25 existing AMPS may be delayed or modified on 58 allotments occurring in the 31 wilderness inventory units. The improved vegetative response in the long term would enhance the wilderness characteristics of the affected wilderness inventory units.

Enhancement of Sensitive Resource Values Alternative - All proposed range developments and grazing systems would be subject to the wilderness guideline constraints. No significant impacts are anticipated. Implementation of the new AMPs or modification of the 25 existing AMPs may be delayed or modified on 58 allotments occurring in the 31 wilderness inventory units. The reduction of 949 AUMs on portions of allotments 006, 039, 052, 059, 077, and 086 within the Ladron Mountain wilderness inventory unit would not significantly enhance the wilderness values in the short term but would slightly improve the wilderness values in the long term.

VRM Class II Areas would benefit from a reduction of 2,236 AUMs and from no construction of range developments. This would enhance any potential wilderness values in these Class II Areas. This would be a long-term, local impact.

No Grazing Alternative - The fencing of private land would adversely affect the visual resources and wilderness values of adjacent public lands on a local basis. Generally, the wilderness character of the 31 wilderness inventory units would benefit over the long term from the elimination of grazing and possible removal of existing range developments.

CUMULATIVE IMPACTS

Proposed Action - No significant impacts should occur.

No Action Alternative - No significant impacts should occur.

Livestock Adjustment Alternative - No significant impacts should occur.

Pasture Capacity Level Alternative - No significant impacts should occur.

Enhancement of Sensitive Resource Values Alternative - A slight improvement in wilderness values would result from removing 949 AUMs from the Ladron Mountain wilderness inventory unit.

No Grazing Alternative - There would be a slight improvement in wilderness values.

CHAPTER 3

THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

This chapter summarizes the trade offs between short-term uses of man's environment with and without the Proposed Action or alternatives. It also predicts the Environmental Statement (ES) Area's long-term productivity. 'Short-term use' is the total production that would occur in 20 years. This is the time it would take to reach the objectives of the Proposed Action or alternatives. The 'long-term productivity' refers to the possible enhancement, maintenance, or decline of the long-term productivity of ecological and economic resources that would continue after the 20 years because of the Proposed Action or alternatives. Short-term uses are measured in animal units (AUs), acre-feet of soil, vegetative animal unit months (AUMs), dollars, etc. The relationship between the short-term uses is determined by calculating the total production under the Proposed Action or alternatives for the 20-year short-term use and comparing it to the estimated total production of the area for the same time period as projected under Future Environment (which is the same as the No Action Alternative). The calculations use the Existing Environment or short-term annual rates (during the first five years), and the long-term (20th year) annual production rate, both shown in Chapter 2, Resource Analysis. The methodology for calculating 20-year total production is in Appendix 10, p. A-117. Long-term productivity is measured in percent change of annual production in the 20th year. Table 3-1 shows the short-term use values (total production) and the changes in long-term productivity.

The increases in total vegetative production (Table 3-1) are paralleled by improvement in range condition (Table 2-6) and increases in density and cover (Table 2-2). The decreases in total income (Table 3-1) result in a decline in the quality of the ranching lifestyle and operator attitudes.

The trade offs during the 20-year short-term use period under the Proposed Action and each alternative are shown in Table 3-2. In order to make positive changes in resource components such as increased vegetation production and decreased sediment yield, negative changes such as decreased animal numbers and decreased direct income would occur. The reduction in livestock numbers and direct income would be reversed in the years after the short-term use period (20 years) under the Proposed Action, Pasture Capacity Level and Enhancement of Sensitive Resource Values Alternatives because of the increase in long-term productivity (Table 3-1). These changes would continue becoming more negative after the 20-year short-term period under the Livestock Adjustment and No Grazing Alternatives because the long-term productivity would be less than under the No Action Alternative (Table 3-1).

In summary for the 20-year, short-term use period there would be trade offs between improving the quality and/or quantity of natural resources (e.g., vegetation, wildlife, wild horses, erosion condition, etc.) and decreasing the total number of livestock (Table 3-1) and total income (Table 3-1) and causing a decline in the quality of the ranching lifestyle for the operators in the ES Area.

After implementation of the Proposed Action a total of ten jobs would be lost. By the end of the short-term use period (20 years) all jobs lost could be regained and one new job would be created. Six subsistence small operators would be reduced to 0 AUMs after implementation of the Proposed Action. By the end of the short-term use period (20 years) two of these operators may reenter the livestock industry when vegetative conditions improve. The other four operators would have their grazing use permanently eliminated.

After implementation of the No Action Alternative a total of two jobs would be lost. By the end of the short-term use period (20 years) all jobs lost could be regained. The number of operators would not change from the existing situation.

After implementation of the Livestock Adjustment Alternative a total of ten jobs would be lost. By the end of the short-term use period (20 years) all but one job lost could be regained. Six subsistence small operators would be reduced to 0 AUMs after implementation of the Livestock Adjustment Alternative. By the end of the short-term

TABLE 3-1

TOTAL PRODUCTION FOR 20 YEARS AND CHANGES IN LONG-TERM PRODUCTIVITY

Resource Component	Annual Production Rate Years 1-5	Annual Production Rate Year 20	Total Production 20 Years	Net Change From Future Environment	% Change Total Production	Long-Term Productivity /1
Vegetation Production (AUMs)						
NA/FE	134,942	146,988	2,831,346	--	--	--
PA	134,942	184,488	3,243,846	+412,500	+15	+26
LA	134,942	174,811	3,137,399	+306,053	+11	+19
PCL	134,942	216,592	3,596,990	+765,644	+27	+47
ESR	134,942	221,920	3,655,598	+824,252	+29	+51
NG	134,942	359,924	5,173,642	+2,342,296	+83	+145
Average Sediment Yield (ac-ft/yr)						
NA/FE	1,483	1,380	28,527	--	--	--
PA	1,483	1,115	25,612	-2,915	-10	-19
LA	1,483	1,195	26,492	-2,035	-7	-13
PCL	1,483	1,030	24,677	-3,850	-13	-25
ESR	1,483	1,030	24,677	-3,850	-13	-25
NG	1,483	478	18,605	-9,922	-35	-65
Groundwater Withdrawal (ac-ft/yr)						
NA/FE	258	270	5,292	--	--	--
PA	214	277	4,973	-319	-6	+3
LA	214	268	4,874	-418	-8	-1
PCL	189	318	5,199	-255	-5	+18
ESR	171	318	5,037	-93	-2	+18
NG	145	145	2,900	-2,392	-45	-46
Livestock (AUs)						
NA/FE	19,108	20,200	394,172	--	--	--
PA	15,804	20,529	368,055	-26,117	-7	+2
LA	15,823	19,724	359,200	-34,972	-9	-2
PCL	13,931	23,183	380,392	-13,780	-3	+15
ESR	12,674	23,598	373,633	-20,539	-5	+17
NG	11,006	11,006	220,120	-174,052	-44	-46
Direct Income ($)						
NA/FE	2,399,368	2,532,589	45,897,040	--	--	--
PA	1,979,537	2,552,837	45,897,040	-3,555,751	-7	+1
LA	1,979,537	2,467,854	44,962,227	-4,490,564	-9	-3
PCL	1,689,481	2,613,109	43,949,528	-5,503,263	-11	+3
ESR	1,549,126	2,758,084	44,281,058	-5,171,733	-10	+9
NG	1,332,536	1,332,536	26,650,720	-22,802,071	-46	-47
Wildlife (AUMs)						
NA/FE	2,362	2,394	47,592	--	--	--
PA	4,802	5,041	98,669	+51,077	+107	+111
LA	4,802	4,893	97,041	+49,449	+104	+104
PCL	4,802	5,057	98,845	+51,253	+108	+111
ESR	5,018	5,287	103,319	+55,727	+117	+121
NG	79,255	138,914	2,241,349	+2,193,757	+4,610	+5,703
Wild Horses (AUMs)						
NA/FE	384	549	495	--	--	--
PA	384	549	495	--	--	--
LA	384	549	495	--	--	--
PCL	384	549	495	--	--	--
ESR	1,583	3,111	48,468	+38,885	+410	+467
NG	1,695	3,535	54,140	+44,645	+470	+544
Recreation (Visitor Days)						
NA/FE	34,946	49,903	863,447	--	--	--
PA	34,946	49,903	863,447	--	--	--
LA	34,946	49,903	863,447	--	--	--
PCL	34,946	49,903	863,447	--	--	--
ESR	34,946	49,903	863,447	--	--	--
NG	34,946	49,903	863,447	--	--	--

/1 The long-term productivity is the percent change between the annual production rate for the Future Environment and the annual production rate in the 20th year of the Proposed Action and Alternatives.

EE - Existing Environment
PA - Proposed Action
PCL - Pasture Capacity Level Alternative
NG - No Grazing Alternative
NA/FE - No Action Alternative and Future Environment
LA - Livestock Adjustment Alternative
ESR - Enhancement of Sensitive Resource Values Alternative

Source: Table 2-1

Table 3-2

TRADE-OFFS UNDER THE PROPOSED ACTION AND ALTERNATIVES FOR THE 20-YEAR, SHORT-TERM USE PERIOD /1

			Change in 20 Year Production and Percent Change				
	Units	No Action Alternative Production	Proposed Action	Livestock Adjustment	Pasture Capacity Level	Enhancement of Sensitive Resource Values	No Grazing
Desirable Changes							
Increased Total Vegetative Production	AUMs	2,831,346	+412,500 (+15)	+306,053 (+11)	+765,644 (+27)	769,868 (+27)	2,417,855 (+85)
Decreased Total Sediment Yield	ac-ft/yr	28,527	-2,915 (-10)	-2,035 (-7)	-3,850 (-13)	-3,850 (-13)	-9,922 (-35)
Decreased Total Groundwater Withdrawals	ac-ft/yr	5,292	-319 (-6)	-418 (-8)	-255 (-5)	-93 (-2)	-2,392 (-45)
Increased Total Wildlife Forage Available	AUMs	47,511	+51,158 (+108)	+49,530 (+104)	+51,334 (+108)	+53,432 (+112)	+2,193,676 (+4,617)
Increased Total Wild Horse Forage Available	AUMs	9,583	0 (0)	0 (0)	0 (0)	+38,885 (+406)	+41,029 (+428)
Undesirable Changes							
Decreased Total /2 Livestock Numbers	AUMs	393,686	-25,460 (-6)	-34,315 (-9)	-13,303 (-3)	-20,053 (-5)	-172,146 (-44)
Decreased Total /2 Direct Income	Dollars	49,454,780	-3,557,740 (-7)	-4,492,553 (-9)	-5,505,252 (-11)	-5,173,722 (-10)	-22,804,060 (-46)

/1 Trade-offs are based on the difference between No Action Alternative and the Proposed Action and other alternatives. The differences are between the total production for 20 years needed to meet the objectives of the various alternatives.

/2 Includes non-public land AUs and direct income derived therefrom.

Source: Table 3-1

use period (20 years) two of these operators may reenter the livestock industry when vegetative conditions improve. The other four operators would have their grazing use permanently eliminated.

After implementation of the Pasture Capacity Level Alternative a total of fifteen jobs would be lost. By the end of the short-term use period (20 years) all jobs lost could be regained and seven new jobs would be created. Six subsistence small operators would be reduced to 0 AUMs after implementation of the Pasture Capacity Level Alternative. By the end of the short-term use period (20 years) two of these operators may reenter the livestock industry when vegetative conditions improve. The other four operators would have their grazing use permanently eliminated.

After implementation of the Enhancement of Sensitive Resource Values Alternative a total of eighteen jobs would be lost. By the end of the short-term use period (20 years) all jobs lost could be regained and nine new jobs would be created. Eleven operators would be reduced to 0 AUMs after implementation of the Enhancement of Sensitive Resource Values Alternative. By the end of the short-term use period (20 years) seven of these operators may reenter the livestock industry when vegetative conditions improve. The other four operators would have their grazing use permanently eliminated.

After implementation of the No Grazing Alternative a total of 22 jobs would be lost and not reinstated in the long term. Fifteen operators would be permanently eliminated.

CHAPTER 4

CONSULTATION AND COORDINATION

4

TEAM ORGANIZATION

This Environmental Statement (ES) was prepared by a team of Bureau of Land Management (BLM) professionals from the BLM Socorro District Office. This team had members with expertise in a broad spectrum of resources: geology, vegetation, soils, water resources, wildlife, livestock, socio-economics, wild horses, cultural resources, recreation, visual resources, wilderness, and writing-editing.

The East Socorro Grazing ES Team was organized in Socorro on April 18, 1977. All team members were District personnel who were already familiar with the Area. All team members received three days of training in Environmental Statement preparation in Albuquerque, New Mexico during January 1977. This was provided by the BLM staff from the Washington and New Mexico State Offices. In addition, the Washington and New Mexico State Office BLM staffs were taken on a tour to familiarize them with the ES Area.

CONSULTATION AND COORDINATION FOR DRAFT ES

During preparation of the Draft, State and other Federal agencies, as well as private individuals and universities with expertise relating to the Proposed Action, were contacted for information. Records of personal contacts and telephone contacts are on file in the BLM Socorro District Office. Prior to preparing the Draft ES, BLM issued contracts for information regarding cultural resources, threatened and endangered plants, water quality, socio-economics, and livestock grazing.

Public involvement in the preparation of this ES was initiated shortly after the District was notified to prepare an ES. In July of 1975, the Socorro District mailed a notice containing two news articles explaining the Court Order and Court Agreement that directed BLM to prepare ESs. This was followed in August 1975 by an information letter announcing a public meeting which was held in Socorro on September 10, 1975. A public meeting was also held in Quemado, New Mexico on October 23, 1975.

During the range survey, soil survey, and Allotment Management Plan (AMP) preparation, numerous contacts were made with the livestock permittees.

The Socorro District Multiple Use Advisory Board toured the ES Area in November 1976 to obtain a better understanding of the range survey and AMP development procedures.

Letters were sent to various individuals and organizations on June 27, 1977, describing the ES preparation process and requesting input. They included:

Federal Agencies - 25
State Agencies - 12
Local Governmental Agencies - 8
Environmental Interest Groups - 33
Energy Groups - 21
Allottees - 103
Livestock Organizations - 4

Seventeen newspapers, 21 radio and 3 TV stations that serve the ES Area received a news release in July 1977. Allottees and interest groups received a fact sheet in August 1977 describing progress. Allottees also received copies of the Advisor, a BLM New Mexico State Office publication, which featured an article about the Socorro ES in the August 1977 edition. The Socorro District Office made an effort to inform the public through information presented in a booth at the Socorro County Fair, held September 2-4, 1977.

These efforts to involve the public resulted in the following comments:

FEDERAL AGENCIES

Agricultural Research Services, Beltsville, MD.

Comment via letter: Furnished advice on determining sediment yield.

Dale B. Raitt

Bureau of Reclamation, Southwest Region, Amarillo, TX.

Comment via letter: Stated that the ES Area is just north of the Bureau of Reclamation Elephant Butte Reservoir and may affect that area. Mr. James Kirby, Project Superintendent for the Rio Grande Project, should be contacted for additional input.

James W. Kirby

Bureau of Reclamation, Rio Grande Project, El Paso, TX.

Comment via letter: Noted that construction of range improvements and vegetative manipulation will impact Elephant Butte Reservoir. Representatives of the two agencies should meet to discuss the dual management of the Elephant Butte Area.

Felix J. Sedillo
Department of the Army, White Sands Missile Range, NM.

Comment via letter: Stated portions of the ES Area are contiguous to areas used by the Missile Range. The northern and northwestern boundaries of WSMR have minimum fencing and there are no plans to construct additional fencing.

Fish and Wildlife Service, Albuquerque, NM.

Comment via letter: Stated there would be no impact to endangered species in the ES Area.

Keith T. Pfefferle
U. S. Forest Service, Supervisor's Office, Cibola National Forest, Albuquerque, NM.

Comment via letter: Said the Forest Service is very interested in the BLM grazing program since the ES Area borders the Cibola National Forest.

Bernard H. Brunner
U. S. Forest Service, Cibola National Forest, Magdalena Ranger District

Comment via letter: Mentioned two allottees graze both Forest Service and BLM lands. The Forest Service wishes to be kept informed of any management practice which would alter the grazing pattern on adjacent National Forest lands. How would BLM fences affect access to the National Forest?

National Climatic Center, Asheville, NC.

Comment via letter: Provided rainfall data.

Edwin A. Swenson
Soil Conservation Service, Albuquerque, NM.

Comment via letter: Said SCS has been studying the Sevilleta National Wildlife Refuge from which livestock have been excluded. The findings may be of value in writing the ES.

Joe G. Batson
Soil Conservation Service, Las Cruces Area Office, Las Cruces, NM.

Comment via letter: Stated the SCS has responsibilities which affect the grazing program. On ranches which contain intermingled public and private lands, the SCS can assist ranchers to develop range management systems.

NEW MEXICO STATE AGENCIES

Frank E. Kottlowski
New Mexico Bureau of Mines and Mineral Resources, Socorro, NM.

Comment via letter: Dr. John Hawley would be pleased to review the completed ES and give geologic input.

New Mexico Department of Game and Fish, Albuquerque, Las Cruces, and Santa Fe, NM.

Comments via letter, phone, and personal contact: Provided data on wildlife populations and information about threatened and endangered species. Made recommendations concerning wildife habitat.

Laboratory of Anthropology

Comment via personal contact: Provided information on the archaeology of the ES Area.

Robert S. Nanninga
Middle Rio Grande Conservancy District, Albuquerque, NM.

Comment via letter: The grazing program will not affect the Conservancy District since nearly all lands are privately owned.

Tommy J. Fajardo
New Mexico State Highway Department, District No. 1, Deming, NM.

Comment via letter: Stated no new roads are contemplated within the ES Area except for the upgrading of 7 miles of State Road 107. Fencing both sides of the highway might be required.

Thomas W. Merlan
State Historic Preservation Officer, Santa Fe, NM.

Comments via phone, letter, and personal contact: Consulted several times to determine which sites were eligible for nomination to National Register of Historic Places.

EDUCATIONAL INSTITUTIONS

Dr. Reldon F. Beck
Department of Animal and Range Science, New Mexico State University, Las Cruces, NM.

Comment via letter: Reviewed procedures for measuring potential productivity and range condition.

Dr. Gary Donart
Department of Animal and Range Science, New Mexico State University, Las Cruces, NM.

Comment via phone: Provided information about grazing systems.

Karl Laumbach
Department of Sociology and Anthropology, New Mexico State University, Las Cruces, NM.

Comment via phone: Discussed impacts on cultural resources due to cattle grazing.

Dr. Bobby Rankin
Department of Animal Science, New Mexico State University, Las Cruces, NM.

Comment via phone: Provided information about wild horses.

Dr. Jerry Schickedanz
Range Management Specialist, New Mexico State University, Las Cruces, NM.

Comments via phone and personal contact: Discussed range survey methods and the effects of grazing on creosote.

Dr. Marshall Haferkamp
Range Science Department, Texas A&M University, College Station, TX.

Comment via phone: Provided literature concerning rotational grazing systems.

PRIVATE GROUPS OR INDIVIDUALS

Mr. Riss Bishop
Rancher, Mountainair, NM.

Comment via letter: Ranchers have adopted advanced range management practices to enhance ranch operations.

Grazing has no effect on air quality although overgrazing can cause soil erosion. This is minimized and vegetation improved by moderate grazing. Water developments benefit livestock and wildlife alike. Ranchers want to make their own decisions without outside intervention because it affects their livelihood.

Mrs. Helen A. Reilly
International Society for the Protection of Mustangs and Burros, Reno, NV.

Comment via letter: The Society urged an increased supervision of range use, a readjustment of grazing privileges to proper grazing capacity, enforcement of seasonal livestock use, and a full consideration of environmental impacts of competing land use.

Mr. J. P. Oney
Rancher, Mountainair, NM.

Comment via letter: Ranchers are concerned about the environment since they make a living from the land. Environmental impacts of grazing are minimal on a well managed ranch. Air and water quality are not affected. Soil erosion is possible on trails and roads but can be stopped through maintenance. It is best to graze moderately and distribute cattle evenly over the range.

I do not believe in government intervention and regulation. It can only complicate an already tough competitive business. No outside advice can be taken as law, because outsiders do not have the close contact with the land to make the critical decisions necessary to protect the land or my economic situation.

Rod Hille
Sierra County Farm Bureau, Truth or Consequences, NM.

Comment via letter: Compulsory grazing systems which include private and State land violate civil rights. The rancher can make more competent decisions than the BLM manager since the rancher lives with his operation. BLM does not take the economic impact on each rancher into consideration. Grazing systems should be flexible rather than tied to a fixed timetable. BLM should seek the cooperation of the permittees.

Harvey M. Williams
Southwestern New Mexico Audubon Society, Silver City, NM.

Comment via letter: At present too many cattle are allowed to graze, adversely affecting soil and vegetation, including riparian zones. Fewer grazing animals would extend the grazing life of the range rather than deplete it.

Jeff Edwards
Wild Horse Research Farm, Porterville, CA.

Comment via letter: Does not feel he has any input that would be of value to the ES.

COORDINATION IN REVIEW OF DRAFT ES

Comments on the Draft ES were requested from the following agencies and interest groups. Those marked with an asterisk (*) submitted written response.

FEDERAL AGENCIES

U. S. Department of Agriculture

Agricultural Stabilization and Conservation Service
Forest Service
*Soil Conservation Service

*Environmental Protection Agency

U. S. Department of the Interior

Advisory Council on Historic Preservation
Bureau of Mines
*Bureau of Reclamation
*Fish and Wildlife Service
*Heritage Conservation and Recreation Service
*National Park Service
U. S. Geological Survey

U. S. Department of the Army

*Corps of Engineers
White Sands Missile Range

NEW MEXICO STATE AGENCIES

*Department of Game and Fish
Department of Natural Resources
Division of State Forestry
Environmental Improvement Division
Middle Rio Grande Conservancy District
Middle Rio Grande Council of Governments
*New Mexico State Clearinghouse
*New Mexico Office of the Governor
Southern Rio Grande Council of Governments
State Engineer's Office
State Highway Department
State Historic Preservation Office
State Land Office
State Planning Office

LOCAL GOVERNMENTS

City of Socorro
Laguna Planning Commission
*Pueblo de Acoma
Sierra County Commissioners
Socorro County Commissioners
The Navajo Nation
Torrance County Commissioners
Valencia County Commissioners
Village of Magdalena

ENVIRONMENTAL INTEREST GROUPS

Ada County Fish and Game League
*American Horse Protection Association
*Audubon Society
Center for Environmental Research Central Clearinghouse
Central Rio Grande Soil and Water Conservation District
Friends of the Earth
International Society for the Protection of Mustangs and Burros
Jornada Resource Conservation and Development
National Council of Public Land Users
National Mustang Association
National Wildlife Federation
Natural Resources Defense Council
Nevada Outdoor Recreation Association
New Mexico Association of National Resource Conservation Districts
New Mexico Conservation Coordinating Council
New Mexico Ornithological Society
New Mexico Wilderness Study Committee
Oregon Environmental Council
*Salado Soil and Water Conservation District
Sierra Club
Socorro Soil and Water Conservation District

Southwest New Mexico Resource Conservation and Development
*Spanish Barb Wild Horse Research Farm
Spanish Mustang Registry
Wild Horse Organized Assistance
Wilderness Society

LIVESTOCK INTEREST GROUPS

*New Mexico Farm and Livestock Bureau
*New Mexico Cattle Growers
Public Lands Council
Sierra County Farm Bureau
*West Central Grazing Permittees Association

PROFESSIONAL SOCIETIES

Society for Range Management
Soil Conservation Society of America
The Wildlife Society

OTHER GROUPS

Arizona State University
Eastern New Mexico University
Museum of New Mexico
Navajo Tribal Museum
*New Mexico State University
School of American Research
University of New Mexico

INDIVIDUALS

James Morgan
*Jerry Schickedanz
*Livestock Permittees

Public Review of the Draft ES

The East Socorro Grazing ES was filed with the Environmental Protection Agency (EPA) on March 13, 1979. A notice was published in Federal Register, Volume 44, No. 53, summarizing the purpose of the statement, listing where to obtain copies, and giving information regarding the public hearings.

The 45-day comment period began March 23 and ended at the close of business on May 7, 1979.

Approximately 450 copies of the Draft ES were mailed to Federal, State and local government agencies, and various groups and individuals for their comments. An additional 150 copies were requested by members of the public during the comment period. The Federal Register Notice also listed locations of reading copies which were available to the public.

Information regarding the release of the East Socorro Grazing ES was published in the Socorro Defensor Chieftain, the Las Cruces Sun News, the Albuquerque Journal, the Gallup NM Independent, Portales News Tribune, and the Valencia Co. News Bulletin.

A public meeting was held in Socorro April 17, 1979. The purpose was to give the public an opportunity to ask any questions regarding the statement that they might have. District Manager Arlen Kennedy conducted the meeting. A panel consisting of BLM employees was available to answer questions. Ninety-five individuals attended the meeting. The attendance was predominantly local farmers and ranchers but also included representatives from several local government agencies, New Mexico State University, and the New Mexico Cattle Growers Association.

Public Hearings

Two public hearings were held regarding the East Socorro Grazing ES. BLM New Mexico Associate Director Larry Woodard presided at both hearings. A panel of Socorro District BLM employees was present to ask questions of witnesses for clarification purposes. A court reporter was present at both hearings to record the verbatum transcript. Copies are available for review at the Socorro District Office.

The Socorro hearing was held April 24, 1979 at 7 p.m. in the County Courthouse. One-hundred and five individuals were present. Thirteen people presented oral testimony and an additional twenty submitted copies of written testimony.

The Albuquerque hearing was held April 25, 1979 at 7 p.m. at the Convention Center. Thirty-two individuals were present. Three people presented oral testimony.

Handling of Public Comments and Review Procedures

The review procedure for impacts to Cultural Resources is slightly different and preceded the public review period of the ES.

The 106 Statement has been prepared in compliance with the National Historic Preservation Act of 1966. This document addresses impacts of the Proposed Action and alternatives on those sites determined eligible for the National Register. The SHPO has reviewed the affects of the Proposed Action and the alternatives on the sites determined eligible for the National Register. His concurrence with the project design features and mitigating measures is documented in the 106 Statement. This can be reviewed at the Socorro District Office. The letter from the SHPO is included in the ES on the following page.

On March 16, 1979 the DES and the 106 Statement (including the letter from the SHPO) were sent to the Advisory Council on Historic Preservation. Unless the Executive Director notes an objection to the determination of no adverse effect within 30 days after receipt of adequate documen-

STATE OF NEW MEXICO
EDUCATIONAL FINANCE AND CULTURAL AFFAIRS DEPARTMENT
HISTORIC PRESERVATION PROGRAM
SANTA FE
87503

P.O. BOX 1629

AREA CODE 505
TELEPHONE 827-2108

March 1, 1979

Mr. Arlen P. Kennedy
District Manager
Socorro District
Bureau of Land Management
Post Office Box 1217
Socorro, New Mexico 87801

Attn: Ms. Cassandra Richard
District Archeologist

Dear Mr. Kennedy:

The Determination of Effect of East Socorro Grazing Environmental Statement on Cultural Resources prepared by the Socorro District in compliance with Section 106 of the National Historic Preservation Act and with Section 2(b) of Executive Order 11593 has been reviewed by this office.

It is our opinion that this determination adequately addresses the significance of the resources and identifies the potential impacts which may result from the several management alternatives presented in the Environmental Statement. The report also proposes measures to mitigate adverse effects which may result from certain aspects of the alternatives. We believe that the suggested measures will provide adequate protection for these resources.

Further consultation with this office is recommended as management alternatives are selected for implementation and plans for the proposed range developments become more specific. These consultations should include evaluations of the necessity for additional resource surveys and determination of significance and effect for newly recorded cultural resources.

Since it appears that all significant resources can be protected and preserved we would also recommend that formal nomination of these sites and districts to the National Register of Historic Places be made. However, if additional research in the vicinity of the eligible districts is planned in the near future, the nominations for these resources should await the results of this work.

Should you have any questions regarding our comments on your determination of effect, do not hesitate to contact this office.

Sincerely,

Thomas W. Merlan

Thomas W. Merlan
State Historic
Preservation Officer

DER:dg

tation, the Agency Official may proceed with the undertaking. Since a letter was not received from the Advisory Council, it is assumed the ES is in compliance with 36CFR 800.4 (Agency Procedures).

All written comments and the hearing transcripts have been sent with the Final ES to the Secretary of the Interior and the Council on Environmental Quality. They are also available for inspection at the New Mexico State Office, Federal Building, Santa Fe, New Mexico; and the District Office, Socorro, New Mexico.

All comments received on the Draft were reviewed and considered in the development of the FES. Comments which presented pertinent additional information, questioned the adequacy of the analysis, and/or raised questions or issues bearing directly upon the environmental effects of the proposal and the alternatives were responded to and used in specifying needed changes in the document. Those comments not directly related to the ES or the adequacy of the analysis were not responded to in the FES. This type of question or comment will be answered in a letter by the responsible BLM employee.

Table 4-1 shows the log number assigned to each letter in the order that it was received. If the letter included comments which were identified as requiring a response in the ES, the area or resource it pertains to is shown by an "X." Some letters included several areas requiring response.

The following section includes letters of comment which were submitted by the public and the appropriate response. They have been reproduced and printed in the order that they were received. Each letter has been assigned a log number.

Comments or questions which have been identified as requiring a response in the ES are numbered within each letter and start over with each new letter. For example: comment number 27-5 would mean letter number 27 and the fifth comment within that letter. If a letter contains comments which require responses, these responses are placed directly following the letter.

The following letters required no response in the ES:

2. Wild Horse Research Farm
3. Heritage Conservation and Recreation Service
4. Walton Hawk
5. Dean Risinger
7. Department of Game and Fish
8. Department of the Army
10. Emilia DeGeer
11. J.L. Fullingim
13. E.B. Armijo
15. Pat Dow
16. Carl Popp
17. Paul R. Krehbiel
18. James T. Smith
19. Howard Little
23. Charles Monette
24. Audobon Society
26. Arvilla Knight, P.R.M.
33. Van Landingham Construction Co.
34. State Clearinghouse
35. Harold L. Quinn
40. U.S. Fish and Wildlife Service
42. Environmental Protection Agency

TABLE 4-1

ALL LETTERS OF COMMENT

	I.PA	NA	LA	PCL	ESR	NG	II.INTRO	VEGETATION	SOILS	WATER	LIVESTOCK	SOCIO-ECON	WILDLIFE	WILD HORSES	CULTURAL RES.	RECREATION	VISUAL RES.	WILDERNESS	III.	IV.	APPENDICES	1	2	3	4	5	6	7	8	9	10	EDITORAL	VISUALS	DATE REC'D
Letter #1																																X		3/26
Letter #2																																		3/26
Letter #3																																		3/26
Letter #4																																		3/26
Letter #5																																		4/2
Letter #6															X																			4/12
Letter #7																																		4/18
Letter #8																																		4/18
Letter #9														X																				4/27
Letter #10																																		4/30
Letter #11																																		5/1
Letter #12							X	X			X	X					X																	5/2
Letter #13																																		5/2
Letter #14										X		X																						5/4
Letter #15																																		5/4
Letter #16																																		5/7
Letter #17																																		5/7
Letter #18																																		5/7
Letter #19																																		5/7
Letter #20													X										X											5/7
Letter #21	X							X	X	X			X										X											5/7
Letter #22																	X																	5/7
Letter #23																																		5/7
Letter #24																																		5/7
Letter #25																				X														5/7
Letter #26																																		5/7
Letter #27	X	X					X	X	X	X	X	X	X						X			X	X											5/7
Letter #28*	X						X	X	X	X	X						X			X														5/7
Letter #29	X											X	X																					5/8
Letter #30																	X																	5/8
Letter #31												X																						5/8
Letter #32																																		5/8
Letter #33																																		5/8
Letter #34																																		5/8
Letter #35																																		5/8

TABLE 4-1 (continued)

ALL LETTERS OF COMMENT

	I.PA	NA	LA	PCL	ESR	NG	II.INTRO	VEGETATION	SOILS	WATER	LIVESTOCK	SOCIO-ECON	WILDLIFE	WILD HORSES	CULTURAL RES.	RECREATION	VISUAL RES.	WILDERNESS	III.	IV.	APPENDICES	1	2	3	4	5	6	7	8	9	10	EDITORAL	VISUALS	DATE REC'D
Letter #36	X						X	X	X	X		X	X		X							X	X									X	X	5/8
Letter #37																						X												5/8
Letter #38																																		5/9
Letter #39									X																									5/9
Letter #40																																		5/14
Letter #41													X										X									X	X	5/21
Letter #42																																		5/2

PA - PROPOSED ACTION

NA - NO ACTION

LA - LIVESTOCK ADJUSTMENT

PCL - PASTURE CAPACITY LEVEL

ESR - ENHANCEMENT OF SENSITIVE RESOURCE VALUES

NG - NO GRAZING

* Letters under dotted line indicated letter received after time permitted.

DEPARTMENT OF SOCIOLOGY AND ANTHROPOLOGY
CULTURAL RESOURCES MANAGEMENT DIVISION

Box 5700/Las Cruces, New Mexico 88003
Telephone (505) 646-2520, 1447

NEW MEXICO STATE UNIVERSITY

1

March 22, 1979

Mr. Arlen P. Kennedy
District Manager
Socorro District, Bureau of Land Management
P.O. Box 1217
Socorro, NM 87801

Dear Mr. Kennedy:

This letter is in response to your request of March 16, 1979 for review and comment on the East Socorro Draft Grazing Environmental Statement. Our office has reviewed the content of the Cultural Resources section of that document (pp. 2-119 through 2-125). It is considered to be a satisfactory summation of the present archaeological environment. Possible future impacts, depending upon the alternative chosen, have also been well described.

Two instances of errata occurred on page 4-2:

Laumback should be Laumbach

Arthropology should be Anthropology

If additional comments are needed, please do not hesitate to ask.

Sincerely,

Karl W. Laumbach

Karl W. Laumbach

lm

WILD HORSE RESEARCH FARM

Barb Spanish Barb Cayuse Indian Pony

248 N. Main St., Porterville, California 93257 • Phone: (209) 781-1225 – 784-6408

3-23-79

2

Bureau of Land Management
Socorro District Office
Dear Mr. Arlen P. Kennedy:

Thanks for the Draft enviremental statement on the Socorro Area. It is well done and complete but since I am interested in the Wild horses I again see that the BLM has no idea at all about the horses to put on the range and as usual they really just get the mongrel wild horses.

It is strange they just consider a wild horse numerically instead of as a breed that more simulates the little spanish horses that were there originally. We all know there is domestic blood crossed into them now but some are not as domestic as others. I visited the Pryor Mountain Reserve when they were culling and they decide on the horses with a prototype nearer to the domestic horses.

I am enclosing some material that might help in the culling of the horse herd to make the herd more of a breed herd and not just a conglomoration of wild horses.

This would help in many ways as it would give credalance to culling the horses and the number to keep would be less as there are not many good horses in the wild herds.

If you have questions on these horses and the research feel free to contact me again. I realize you are now in the planning of the area and perhaps the question of the horses will come later.

Sincerely,

Jeff Edwards

Jeff Edwards

United States Department of the Interior

HERITAGE CONSERVATION AND RECREATION SERVICE
SOUTH CENTRAL REGION
5000 MARBLE AVENUE, N.E., ROOM 211
ALBUQUERQUE, NEW MEXICO 87110

3

IN REPLY REFER TO:
4130

March 23, 1979

Memorandum

To: District Manager, Socorro District, Bureau of Land Management

From: Regional Director, South Central Region

Subject: East Socorro Grazing Draft Environmental Statement - 1792

As requested in your memorandum of March 19, 1979, we have reviewed the subject statement and have no comments to offer.

Rolland B. Handley

Rolland B. Handley

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
SOCORRO DISTRICT OFFICE
P. O. Box 1217
Socorro, New Mexico 87801

IN REPLY REFER TO:
1792

4

March 16, 1979

The East Socorro Draft Grazing Environmental Statement has been completed and is ready for public review. Reading copies are available at the BLM Socorro District Office, the BLM State Office in Santa Fe, and libraries at Socorro, Albuquerque, Truth or Consequences, Las Cruces or Belen. Copies are also available upon request from the BLM Socorro District Office, P. O. Box 1217, Socorro, New Mexico 87801.

The project involves initiation of a livestock grazing program on 1,318,000 acres of land (839,000 acres of public land). The purpose is to enhance the vegetative resource, improve range conditions, reduce erosion, improve water quality, provide quality habitat for wildlife ? and wild horses, protect archaeological and historical sites, and provide a continuous supply of livestock forage.

Public hearings for submission of oral and/or written testimony regarding the adequacy of the Statement are being scheduled in both Socorro and Albuquerque. If you need more information, contact Steve Fischer, BLM Public Affairs Officer, phone: (505) 835-0412.

Walter Hawk
San Cristobal, N.M.

Sincerely,

Jerry P. Townsend

Arlen P. Kennedy
District Manager
Acting

3/24/79

Dear Sir:

My address has changed from Las Vegas, N. Mex. to San Cristobal, N. Mex. 87564.

I had not heard your district had any so called wild Horses; if you do not have them now, surely you are not going to permit any feral horses or burros to be turned loose on your range. I believe these Feral Exotics should be removed from our Public Lands.

Sincerely:
Walter Hawk

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

3-25-79

5

Dear Mr. Kennedy,

We are the owners of the Sierra Grande Ranch (Martin Cattle Co.) in Socorro + Catron Counties and are very concerned over the EIS issue.

The ranch is approximately 8% BLM and we feel that it should be excluded from the restricted stocking rate.

I would appreciate any advise or information from you concerning any developments on the matter.

Best Regards,
Dean Kiesinger

United States Department of the Interior
NATIONAL PARK SERVICE
SOUTHWEST REGION
P.O. Box 728
Santa Fe, New Mexico 87501

6

IN REPLY REFER TO:
L7619(SWR)PE

APR 11 1979

Memorandum

To: District Manager, Bureau of Land Management, Socorro District, New Mexico

From: Acting Associate Regional Director, Planning and Cultural Resources, Southwest Region

Subject: Review of BLM Draft Environmental Statement, East Socorro Grazing Management, Socorro and Valencia Counties, New Mexico

We have reviewed the subject document and offer the following comments:

6-1 The project area should be inspected by a professional archeologist to determine the presence or absence of archeological resources, and should cite the name and institution of the investigator. Contract specifications should include a sentence to the effect that if any archeological resources are encountered during construction, operations will cease at the discovery site and a professional archeologist will be consulted as to the significance of the material.

Urban E. Rogers

6-1 See change in text (Chapter 1, Project Design Features, No. 2).

State of New Mexico

GOVERNOR
BRUCE KING

DIRECTOR AND SECRETARY
TO THE COMMISSION
HAROLD F. OLSON

DEPARTMENT OF GAME AND FISH

[illegible]

STATE GAME COMMISSION
[illegible], CHAIRMAN
GALLUP
[illegible]
ALBUQUERQUE
[illegible]
CARLSBAD
[illegible]
SILVER CITY
[illegible]
CIMARRON

7

April 16, 1979

Mr. Arlen P. Kennedy
District Manager
District Office
Bureau of Land Management
P. O. Box 1217
Socorro, New Mexico 87801

Dear Mr. Kennedy:

The New Mexico Department of Game and Fish has reviewed the Draft Environmental Statement, Grazing Management in the East Socorro ES Area and wish to make the following comments:

Impacts upon wildlife and wildlife habitat are adequately addressed and anticipated benefits to wildlife are projected as they might occur as a result of the proposed management program. This Department was given the opportunity to provide data and recommendations concerning wildlife and wildlife habitat for consideration in preparation of the draft statement. Consequently, we have no further input to make. I support the implementation of the proposed management plan and anticipate the achievement of the long-range objectives.

Thank you for the opportunity to review and comment upon the draft statement.

Sincerely,

Harold Olson

Harold F. Olson
Director

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
P O BOX 1580
ALBUQUERQUE, NEW MEXICO 87103

SWAED-EP

13 April 1979

Mr. Arlen P. Kennedy, District Manager
Bureau of Land Management
Socorro District Office
P.O. Box 1217
Socorro, NM 87801

8

Dear Mr. Kennedy:

The Draft Environmental Statement on Grazing Management in the East Socorro Area has been reviewed as requested in your letter of March 16, 1979. The statement is comprehensive and exceptionally well done. It contains considerable information which will be useful to us in our current environmental studies associated with our Rio Puerco-Rio Salado investigations.

As you are aware, we are evaluating the possible location of two dams within the East Socorro Grazing Area. They are the Hidden Mountain site on the Rio Puerco about 4.2 miles west of I-25 and the La Jencia site on the Rio Salado about 10.6 miles west of I-25. An additional damsite known as the Loma Blanca site located about 3 miles west of I-25 may also be given additional consideration. The Hidden Mountain and Loma Blanca sites were specifically designated for further study by the Water Resources Development Act of 1976. You have probably received an environmental assessment of our impending soil investigations in the areas of the above damsites which we mailed to you on 5 April 1979 in response to your request.

We look forward to continued close coordination on this matter.

Sincerely yours,

J. Coombes

JASPER H. COOMBES, P.E.
Chief, Engineering Division

9

LAW OFFICES
McCANDLESS & BARRETT
1707 H STREET, N.W.
WASHINGTON, D.C. 20006

ROBERT C. McCANDLESS
DAVID M. BARRETT
RAY L. HANNA
PAUL D. CULLEN
RUSSELL J. GASPAR
RICHARD S. REISMAN

CABLE "SOONER"
SUITE 1005
(202) 223-8440

April 24, 1979

Arlen P. Kennedy
District Manager
Bureau of Land Management
Socorro District Office
P.O. Box 1217
Socorro, New Mexico 87801

Dear Mr. Kennedy:

Thank you for the opportunity to review and comment on the Draft Environmental Statement for the Grazing Management Program for the East Socorro Area. The American Horse Protection Association has carefully considered those parts of the program which would have a direct impact on wild horses.

AHPA has reviewed numerous environmental statements prepared as a result of the decision in National Resources Defense Council, Inc., V. Morton.

The Socorro District has adopted one of the more rational approaches that we have yet encountered toward protection of the wild horses under its supervision. Especially worthwhile will be the proposal to gather information on the population characteristics of the band before drafting the wild horse management plan.

9-1 However, we offer some suggestions for improvement which the final environmental statement should incorporate. First, population estimates indicate that between 1975 and 1977 the wild horse band has fluctuated between 32 and 43 animals. Yet AUMs sufficient for only 32 horses were alloted. Since the horses graze on such a small portion of the total East Socorro area, and since cattle use in the allotment grazed by the horses is being reduced by over 50% (102 head), it would be a small step to allot sufficient AUMs for the maximum estimated size of the band.

9-2 In this respect we also recommend that the proposed population characteristics study be conducted immediately and the results incorporated in the AUM allotment decision and the final EIS. The population study, and the projections of population growth that may be drawn from it, may well indicate that an allotment for 43 horses is not only feasible but necessary to the long-range survival of the existing herd. Thirty-two horses may not be an adequate population base if the proportions of older and male horses is high.

9-3 Finally, while we would wholeheartedly support the "No Grazing" or "Enhancement of Sensitive Resource Value" alternatives described in the draft EIS, we do not realistically expect they will be given serious consideration. Therefore, we suggest that since the anticipated long-term increase in forage availability in the horse area is over 3,000 AUMs, all or most of the increase should be reserved for wild horses. The present proposal allots wild horses only 549 additional AUMs over a 20-year period, or enough to support 13-14 additional horses. If the band presently numbers 45 horses instead of 32, there would be no room for growth under the current proposal. We remind you that under the Wild, Free-Roaming Horse and Burro Act, horses are not step-children on public lands; they are accorded preferred are status.

We hope that the draft Statement will be rewritten to address their comments and criticisms.

Very truly yours,

McCANDLESS & BARRETT

By: Russell J. Gaspar
Russell J. Gaspar
Attorneys for the American
Horse Protection Association

9-1 At the time of the ES writing 32 horses were present in the Wild Horse Area. Until the wild horse plan is completed and a viable herd is determined for this area, AUMs for 32 horses would be apportioned. Apportionment of forage for 32 horses is consistent with the MFP recommendation (p. A-37). The wild horse plan is scheduled to be completed in Fiscal Year '79.

9-2 The population characteristics study cannot be incorporated into the FES because the information is not available at this time.

9-3 The District Manager has the option to make a decision based upon the Proposed Action, a combination of the Proposed Action, and/or any of the alternatives. After the information on the wild horses is gathered and analyzed, a decision will be made concerning the wild horse herd in regard to numbers and apportionment of forage.

10

139 Lake Merced Hill
San Francisco, CA. 94132
April 22, 1979

Socorro District Office BLM
P.O. Box 1217
Socorro, NM 87801

Your Ref: 1972

Attn: Steve Fischer

Dear Sir:

It is incomprehensible to me that the draft Grazing Environmental Statment contains virtually no input from the U.S. Fish and Wildlife Service (page 4-2) in view of the fact that Wildlife controls nearly a quarter of a million acres or about 22 percent of the total E.S. Area. The Soil Conservation Services makes reference to this in its comment (see page 4-2).

Although it appears that BLM and Wildlife are not communicating, the separate actions of these agencies combine to isolate and restrict the small permittee to the point of extinction.

I agree with the Sierra County Farm Bureau that compulsory grazing systems that include public and private lands violate civil rights(page 4-3). I strongly object to proposed reduction of AU's. In my case, allotment 52, the reduction of 64 percent is tantamount to inverse condemnation.

Please refer to Table A-3, page 3, paragraph 3.1 of the statement. Could I obtain a map of the 18,000 acres referred to in column 4? Thank you very much.

Sincerely yours,

Emilia De Geer

11

April 29, 1979

District Manager
Bureau of Land Management
P.O. Box 1217
Socorro, New Mexico 87801

Dear Sir:

In reviewing your East Socorro Grazing Environmental Statement, I find several questions that are not answered.

The drastic proposed cuts in numbers of livestock will have a serious effect on economic conditions in this area. It's hard to understand why these cuts are proposed to be put in effect all at the same time, when over the past twenty years under BLM and ranchers management, and cooperation, the range has improved in general in the area. As an observer interested in conservation-having worked on ranches in this area and with the US Forest Service for the past 40 years, I believe that conditions on overgrazing and soil erosion has improved a lot.

This has been brought about by enactment of the Taylor Grazing Act and BLM efforts in controlling livestock members, and assisting ranchers in conservation management. I thought you were doing a good job all through these years, but after studying your proposed drastic livestock grazing cuts to take effect all at the same time, the only conclusion I can make is you think you have been doing a bad job.(which might not be correct) or you are being very <u>discriminatory</u> to some of these ranchers.

I understand only two years were spent on finishing the ES. This is too short a time for something that has as many variables as range conditions and acerage involved. It would take at least five years for this work.

In range studies on plant growth, soil erosion, etc. contained in the ES for the long term plan, there seems to be more theory than

historical facts. Due to the small amount of rainfall, which is scattered and erratic, the soil in most of this area will only support a certain number of forage plants over a period of years whether it is grazed or not. Range forage is a renewable resource and I believe we should utilize it through proper management as you have done in the past.

I sincerely hope the proposed cuts in livestock use will be reconsidered and more time spent on evaluation of the entire area before you make this final.

Yours truly,

J. L. Fullingim

J. L. Fullingim
P.O. Box 73
Socorro, New Mexico 87801

cc Hon. Pete V. Dominici
Hon. Harrison Schmitt
Hon. Harold Runnels
Hon. Manuel Lujan Jr.

April 21, 1979

12

Arlen Kennedy, Dist. Man.
Bureau of Land Management

Dear Mr. Kennedy,

This letter is in response to your Impact statement on East Socorro. (draft) -

I attended a meeting April 17th, 1979 that you states we had only 45 days in which to respond to the adequacy of the statement. First of all, I feel this amount of time is not nearly sufficient to read and completely understand the very long and technical volume that took you and your staff over two years to compile. I am requesting at least the same amount of time it took you to write the statement in which to make an adequate response. Since the deadline for response is very near, I will attempt to comment in this letter the things I feel should be revised in the event that there is not an extension of time granted.

12-1 1. On page 4-1 under TEAM ORGANIZATION - second paragraph - you state "All team members were district personnel who were already familiar with the area." Due to the fact that almost all of the team members, especially the ones doing the range survey were newly hired in your office for this statement, please tell me <u>how</u> they could possibly be familiar with 1,650,214 acres of land they had not previously seen?

2. On page 1-13 N. Mex. State Land Office

4th paragraph - why has the private individual owning land, intermingled with the federal land, lost rights as far as trespassing, agreement to incorporate private land in proposed grazing systems?

3. On your range study survey, there seems to be no credit given for the benefit of weeds (or annuals) and I would like one of your experts to explain why this very important forage was excluded as feed, when everyone in this area considers weeds as a very important feed?

4. Since your range study survey has been completed, other BLM area's have discontinued using the methods you used because it was not a satisfactory method, so why haven't you done a range study using a better method?

12-2 5. Your impact study seems to have only pointed out the negative aspects of grazing on the public land and I would like to know why you didn't put more effort into pointing out the positive aspects, such as the improvements grazing has done for the land.

6. In your total acreage of 1,650,214 in the E.S. area you use an ~~[illegible]~~ Aerial map, but a cow uses hillsides as well as the flat area, so how can you only count the total flat acres to determine carrying capacity?

12-3 7. You state that most ranchers run below the number of permitted cattle on the ranches in this area but, will you substanciate this statement with some factual information since I believe this to be an inaccurate statement.

8. On our allotment # 0277 you call San Jose Canyon - owned by Mr. & Mrs. Sterling Carter, BLM ~~had~~ has been doing, with our help, actual use studies and ~~plot~~ trend studies which show an improvement, so why has our permit been cut 25%?

12-4 9. On page 2-140 fig. 2-21 you show a windmill and tank with a fence and a few cows and call it "Intrusions associated with grazing", but do not state this as an opinion, which as a visual impact it depends upon the individual as to whether this is scenic rather than intrusive, does it not?

12-5 10. On page 2-81 Socio-Econ. you name nearby trade centers as Socorro, San Antonio, Bingham, Magdalena, Polvadera, Escondida, Riley, Belen and Los Lunas. Why was Truth or Consequences, not included, since at least four ranchers in the E.S. area send their children to school there and most of their trade is there, as well as part of our ranch, including our home is in Sierra County (T. or C., county seat) pop. 7,000, approx.?

12-6 11. How can you claim this ES is adequate when you have no idea what the economics of your various alternatives are? Surely an ES should include factual economic information on the individuals it will affect before it can be considered adequate. You don't even state how many family members there are living and working on each individual allotment;

Thank you for the opportunity to respond to your E.S. eventhough the time allotted is completely insufficient.

Judith L. Carter
San Jose Ranch
T. or C., N. Mex.
87901

C.C.
Sen. Schmitt
Sen. Dominici
Cong. Runnells
Cong. Lujan
Thomas Fitch, Atty at Law.

12-1 All range survey members were classified by the Civil Service Commission as meeting the minimum requirements for a range conservationist. The amount of experience varied from none to several years. Range survey personnel attended training sessions and were paired with more experienced personnel. Due to various reasons, all personnel that started the range survey did not complete it.

As stated in Chapter 4 in the Team Organization section, once the data was compiled, several District personnel representing all resources were assembled to address the impacts of the Proposed Action and alternatives. These individuals were experts in their field and were familiar with the District. They had worked on the District staff several years before being assigned to the ES.

12-2 The ES is only concerned with the Proposed Action and alternatives, not what has happened in the past. If the Proposed Action or one of the alternatives is implemented, the ES predicts increases in long-term production as a result of livestock grazing (except no grazing). The increase in production is one of many positive impacts of livestock grazing. This, in turn, results in increased AUMs, decreased soil loss, etc. These are examples of positive impacts that would occur in the long term.

12-3 On pages 2-2 and 2-77 it states that "some" ranchers use fewer AUMs than what they are licensed for. This information has been substantiated from actual use records, actual livestock counts by BLM personnel during normal range management checks and non-use records. This is not true on <u>every</u> allotment, but only for some allotments.

12-4 Man-made structures are not part of the natural landscape and are intrusions according to VRM criteria. The severity of the impact is determined by a visual resource contrast rating (See p. A-109) that evaluates the degree of change in form, line, color, and texture of major features. It depends on an individual as to whether or not the intrusion adds to or detracts from the scenic values of the landscape.

12-5 T or C was not included because it is not a major trade center for the ES Area. The impacts from the ES would not be significant to this town's economy.

12-6 Each individual alternative was considered on the same level as the Proposed Action. Representative ranch budgets and data from an input-output economic model were used for the economic analysis of each alternative. Individual livestock adjustments were analyzed and were the basis for the ranch size categories.

I am E. B. Armijo, owner of allotment No. 263 (Black Mesa). There are a few items in the Grazing Environmental Statement that I believe need further clarification. Listed below are some allotments taken from the following tables for comparison. **13**

Allotment No.	Table A-1 Proposed Grazing Use Livestock A.U.M.	Wildlife A.U.M.	Proposed Changes in A.U.M. %	Table A-18 Range Survey E.E.
036	1200	7	0	877
081	948	14	0	795
086	2832	84	0	2774
261	2705	79	0	2235
263	1893	86	-9	2564
272	4206	53	+3	4259
279	1500	53	0	1500
289	1620	46	0	1601
290	2287	122	+4	2564
293	6106	144	-3	6267
294	1332	77	+5	1411
300	720	14	0	782

According to the figures on the existing environment, range survey, the proposed grazing use on some allotments is the same or slightly less than the existing A.U.M. as shown on table A-18. I also noticed that most of these allotments have existing Amp's. I also notice from table A-1 that grazing use on this allotments was based on actual use, utilization and trend studies rather than the range surveys. If that is the case, wouldn't it be fair to assume that if a permittee had an existing AMP showing this data, regardless of what the range survey (Existing Environment) is, no cuts in grazing allotments would be necessary?

On the basis of the range survey, table A-18, on which the proposed grazing use was made on the other allotments without AMP, wasn't my allotment reduced unnecessarily? With the information collected in the environmental statement,and in comparison with the existing environment, shouldn't my allotment be increased by at least +3%?

I feel that the 45 day period allowed in which to make comments was very short to thoroughly review the Grazing Environmental Statement.

14

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
ATLANTA, GEORGIA 30333
TELEPHONE: (404) 633-3311

April 30, 1979

Mr. Arlen P. Kennedy
Socorro District Office
Bureau of Land Management
U. S. Department of the Interior
P. O. Box 1217
Socorro, New Mexico 87801

Dear Mr. Kennedy:

We have reviewed the draft environmental impact atatement on Grazing Management in the East Socorro ES Area, New Mexico. We are responding on behalf of the Public Health Service.

Management of the grazing activities appeara necessary in the Socorro District, especially in the areas where soils are subject to wind and/or water erosion. Road development and any major surface disturbances should be limited aa much as possible in critical areas unless apecial measures are taken to prevent increased erosion.

14-1 The draft EIS provides information concerning the high concentrations of minerals and the large amounts of suspended and dissolved solids; however, information is not provided on bacterial quality of existing water supplies. The issue of potential contamination of ground and surface watar supplies should be addressed in the final EIS.

Well facilitiea and other water supply sources should be kept away from water troughs and other areas of livestock concentration. Developed water suppliea should also be posted with information regarding their potability.

14-2 It was noted that coat figures for the proposed alternative are provided in Table A-2 in terms of developments and implementation schedules. Information is alao provided in Tables A-26 through A-37 on estimated receipts, costs, and net returns per ranch size category for the various alternatives proposed. However, the draft EIS does not provide a comparison between governmental costs or a cost/benefit comparison between the various alternatives.

Thank you for the opportunity to review this statement. We would appreciate receiving a copy of the final statement when it is issued.

Sincerely yours,

Frank S. Liaella, Ph.D.
Chief, Environmental Affairs Group
Environmental Health Services Division
Bureau of State Services

14-1 The existing water supplies are for livestock and wildlife use. To our knowledge there are no reported accounts of contamination of groundwater aquifers as they relate to the Proposed Action. Depth to groundwater is considerable on most of the public land so there would be little chance of contamination. We, also, do not see any present deterioration to surface water. Therefore, this was not discussed as there was no impact to either surface water or groundwater from either the Proposed Action or any of the alternatives.

14-2 Benefit/cost analysis was done on individual AMPs for the Proposed Action before the start of the ES. However, benefit/cost analysis was not done on the alternatives; therefore, we cannot make a comparison.

Socorro, New Mexico
May 1, 1979

15

District Manager
Bureau of Land Management
Socorro, New Mexico 87801

Dear Sir:

My name is Pat Dow and I am in the grocery business in the city of Socorro. I operate the Supermart Grocery and also have a 256 acre hay farm and cattle feeding operation south of San Antonio, New Mexico.

I find it difficult to understand the proposed action of the Bureau of Land Management concerning the East Socorro Area. It doesn't make sense because of the effect it will have on the economy of Socorro and the State of New Mexico; Everyone concerned needs an equal opportunity and time to make an intelligent and factual study of the East Socorro Area..

Most, if not all of the ranchers in this area have been in the ranching business a good part or all of their lives and they know how to run a livestock operation. I don't think any one of them would purposely ruin their own range or any lease range they run cattle on.

I have a cattleman friend who has a ranch in another area. He owns about half the range he runs cattle on and the rest is BLM or forest rangeland. For several years he has had drought conditions on much of his range. As a result he has cut back his herd from 400 head to less than 200 head. With range conditions what they were he knew what he had to do.

Much of New Mexico is desert country and God is the only one who can make it rain. And He will put the moisture where and when He wants it.

The rancher has got to be a true conservationist in the management of these lands, otherwise we would have nothing but waste lands and no ranchers. These people care about the land because it is their whole way of life and livlihood. In many instances these ranches have been in families for several generations, and all have practiced the necessary conservation to preserve their ranches.

Because of the drastic impact this proposed cut in cattle numbers in the East Socorro Area would have on the economy of the entire area, a more thorough study should be made and a minimum of a years time should be allowed for comments and other alternatives in the EIS.

Respectfully,

Pat Dow

cc: Secretary of the Interior
Senator Harrison Schmitt
Senator Pete Domenici
Congressman Harold Runnels
Congressman Manuel Lujan

1212 Vista Drive
Socorro, N.M. 87801
May 7, 1979

16

Mr. Arlen Kennedy
District Manager
Bureau of Land Management
Socorro, N.M. 87801

Dear Mr. Kennedy:

I am writing this letter in general support of the recently released East Socorro Grazing Environmental Statement. My interest in the area is due to its proximity to Socorro and the opportunity it offers for recreational use. I realize that grazing is an historic and proper use of the land but it has to be in the context of management and protection. Overgrazing results in water and soil loss, vegetative degradation and overall loss in carrying capacity. Much of the area is already overgrazed and needs protection by the application of reasonable allotment management plans.

Please make these remarks part of the record regarding the Statement.

Sincerely,

Carl J. Popp

Carl J. Popp

May 6, 1979

17

Socorro District Office
U.S. Bureau of Land Management
200 Neel Avenue, N.W.
Socorro, N.M. 87801

Gentlemen:

This letter is submitted in response to the draft East Socorro Grazing Environmental Statement. I commend the BLM for the thorough, competent job that it has done in assessing the present grazing potential of the lands under study, and in formulating grazing management plans for the area. In my opinion, the actions proposed in the statement are necessary to improve watershed conditions in the Socorro District and will be to the long-term benefit of the ranchers. In addition, I favor the actions that are proposed to provide quality habitat for wildlife, preserve archeological and historical sites, and improve the recreation resources of the area.

Please make this letter part of the public record.

Sincerely,

Paul R. Krehbiel

Paul R. Krehbiel
705 Fitch
Socorro, New Mexico 87801

Box 2553, Campus Station
Socorro, New Mexico 87801

May 7, 1979

18

Mr. Arlen P. Kennedy
District Manager
Bureau of Land Management
P.O. Box 1217
Socorro, New Mexico 87801

Dear Mr. Kennedy:

These are my comments on the Draft Environmental Statement on Grazing Management in the East Socorro ES Area. Please make this letter part of the public record.

I have not had time to closely examine the full D.E.S., but I would like to say that I support the Bureau of Land Management's proposed action. While the proposed program will temporarily reduce the numbers of livestock grazing on public lands, the long term productivity of the lands will be protected and enhanced.

Reduced erosion and sedimentation damage will be an important benefit. At a public hearing held in Socorro last fall by the U.S. Army Corps of Engineers, a representative from the Bureau of Reclamation described a project for constructing 13 miles of pilot channels in the Rio Grande, north and south of Socorro. A primary purpose for the pilot channels is the transport of sediment which is washing into the river from eroding lands along its drainage. The estimated cost of the project is $200,000 for the initial construction of the channels, which will have to be reconstructed every three to five years. According to the grazing D.E.S., the proposed action would reduce sediment yield by an estimated 26 percent. I suggest that the BLM, in cooperation with the Bureau of Reclamation, continually study the erosion problems on public lands so that problem areas can be identified and further reductions be made in sediment yield. Such studies and actions should be an important part of the flood control program along the Rio Grande.

Grazing allotment 258 coincides in part with BLM roadless area NM-020-037, which I have recommended for intensive inventory in the BLM's wilderness program. Visual D, which gives locations of existing and proposed developments, shows a proposed spring development, pipeline, and trough in allotment 258. I understand (from conversation with BLM personnel) that the location of the proposed development is in Arroyo de la Presilla, near the section line between sections 11 and 12, T.3S.,R.1E. This location would place the spring in one of several box canyons that occur in roadless area 037 and are scenic highpoints to hikers from the Socorro area. In the terminology used in the Environmental Statement, these box canyons should qualify for at least a Visual Resource Management Class II designation. Although I do not know exactly

what the BLM has planned for the box canyon, I hope any development will be kept fairly inconspicuous. I also wonder if there is really a spring here. There are some tinajas, or water holes, which trap and hold runoff water, but I have seen the area dry at various times. I doubt that there is a permanent spring at this location.

Sincerely yours,

James T. Smith

HOWARD R. LITTLE, D.D.S.
TELEPHONE 835-1851
208 NEEL, N.W. — SOCORRO, NEW MEXICO 87801

19

I think the time for evaluating and studying the East Socorro Environmental Statement was to short. A statement so involved and complex will require several more months for proper evaluation.

It is recommended on the Pequeno allotment to comply with the E. S. that all grazing be deferred during the growing season. This would be a hardship as I have a cow-calf operation.

There will be areas on the west side of the allotment 4 and 5 miles from water. How can these areas be utilized without water development? How can the areas near the present waters improve even with rotation?

We need more time to study the many problems.

Howard R. Little DDS.

April 25, 1979

20

Department of Interior
Bureau of Land Management
P. O. Box 1217
Socorro, New Mexico 87801

Gentlemen:

After reviewing the East Socorro EIS I am very sure of one thing - the government "lingo" is sure to confuse the average layman, or in this case, the rancher.

Why were we not given more than approximately 45 days in which to evaluate and comment on this technical statement? A statement with many discrepancies!

May I remind you that during the time allotted us to read this statement and make a comprehensive comment we are diligently trying to make a living.

We have had an AMP for almost ten years and have been informed yearly by BLM professionals that the plan has been satisfactory, and that range conditions have been improving as expected in all years except one - that being the one year prior to the one you chose for a range survey - a year following a growing season with very little rainfall. How can you justify use of a one-year inaccurate survey in this semi-desert area to determine grazing capacity on public lands for a period of years when it is normal for forage production to change from year to year depending on the rainfall? Will all of your proposals receive the same treatment ten years from now? Do we have any assurance that after another ten years of your management another group of your professionals won't decide that the East Socorro area needs another 30% reduction in livestock numbers? Will I get another 71% reduction in ten years? Why do you not honor your part of the

AMP Contract? You signed it the same as I did, and since you have actual use records and have had my full cooperation I feel you are morally obligated to carry out your part of this cooperative agreement rather than come up with such a ridiculoul proposal based on a one-year inaccurate survey.

I object to the accuracy of your Range Survey as you obviously did not inspect the entire allotment but estimated much of it from a pick-up truck.

20-1 I feel that inexperienced personel cannot be expected to compile an accurate evaluation of range conditions. Based on previous surveys, actual use records, and 9 years of satisfactory reports from the BLM professionals I feel this proposal demands input be considered from the permittee directly affected, plus an accurate report from an experienced group. Such information will no doubt prove how inaccurate your survey is. I fail to understand how you can use this survey based on only one year to destroy all we have worked so hard to accomplish for the other 9 years. Why were the results of this particular survey so different from the one made at the beginning of our AMP and also the one made previous to that unless the outcome had already been determined?

Why did the Bureau choose to use the Ocular Reconveyance method of evaluation in this area? Was it not because it was more suitable to your plan - to reduce livestock numbers? Is it not a predetermined goal of the BLM to reduce livestock numbers 30 per cent? Are you using the Ocular Reconveyance survey method in the EIS which you are preparing for the West Socorro area? Because of higher density have you not selected another method which will be more suitable in establishing your goal to reduce livestock numbers?

Also, I question your determination made in the office as to which areas are suitable for livestock allotment 0297 when it is quite apparent livestock can and have been using these areas for many years - successfully!

20-2 On my allotment, #0297, your proposal calls for approximately 10% of my AUM's are to be adjudicated to wildlife. On previous surveys there was not a signigicant number of deer to consider. How did you come up with the number of deer to justify reducing the AUM's on my allotment which you consider suitable for livestock? A few deer occasionally drift through the area and use slightly, and temporarily, the mountain area which you have decided is unsuitalbe for livestock. Yet using a fictitious figure you have allotted AUM's from the suitable area. How many AUM's did you allot for the deer from the unsuitable area?

In reviewing some of the comments in my file it is evident the Wildlife Professional had considerably more influence and input in preparing the Socorro EIS that other experts. How can these particular wildlife experts be qualified to manage a livestock operation? Did they not prove their expertise when they spent innumerable man hours and a vast amount of taxpayers money watching a "Black Duck" which was supposed to be an endangered species - the "Mexican Duck" ; but was, in fact, just a common cross-breed. When they were informed the duck they were watching was not an "endangered species" the project was ABANDONED! Is it not a fact these experts were promoted to become experts in some other fields? I reiterate - why were they allowed to be so influential in preparing the Socorro EIS when it is obvious they were unqualified? The range and livestock experts should certainly have more influence in making livestock management decisions than

the wildlife experts or other unrelated experts! Why was there not a livestock professional used in preparing the EIS?

In visiting with other permittees having an AMP for the past several years I find they have had similar results as I have, that is: They have been assured by your professionals that their AMP's have been working as expected; then suddenly, and unexpectedly we are told that everything so far has been a mistake. Why?

In part of the EIS you have considered different alternatives. Did you consider asking the State of New Mexico to administer these lands? I would certainly recommend this. You, no doubt, would have undisputed support for such an alternative and would alleviate the state of turmoil you seem to be experiencing and imposing on the permittee.

It seems to me the attitude of the BLM is that their is nothing we can do about these proposals except "take it to court". Why are we obligated to this expense?

Throughout the entire EIS you use the word "overgrazing", this seems to me to be a very biased description which you continually use in place of "insufficient rainfall". This is grossly unfair - to say the least.

Was there a determination made of the normal geologic erosion of the entire area involved and more specifically was there one made on my allotment?

Why is there so much inconsistency in your statement? For example, on page A-42 Table A-6 my allotment is rated 100% Poor or Fair and has a 71% 20-3 reduction. On another allotment it is rated 93% Poor or Fair and received a 5% increase. Still another allotment is rated 34% Fair and received a

41% reduction; another is rated 100% Poor or Fair and received no reduction.

Why have some allotments received a percentage reduction which is greater than the percentage of public lands?

What authority did you have to make range surveys and determine carring capacity on our State Lands and our deeded lands?

As this is the busiest time of our livestock operation it is not feasible for me to fully study and comprehend the EIS. Therefore, I strongly object to the short length of time allowed to read, interpret, and comment on this statement which will seriously affect my life and the life of my family.

In conclusion, I feel the BLM needs to review its decision and re-evaluate this survey before making a decision that will prove to be detrimental to the lives of many people.

J. B. Kelly Wilma Kelly

J. B. Kelly and Wilma Kelly - Allotment 0297
P. O. Box "C"
Socorro, New Mexico 87801

Comments addressed to the above items of disagreement are requested from the BLM.

xc: President Jimmy Carter
Secretary of the Interior Cecil D. Andrus
Governor Bruce King
Senator Pete V. Dominici
Senator Harrison Schmitt
Congressman Harold Runnels
Congressman Manuel Lujan, Jr.
Commissioner of Public Lands Alex Armijo
Dr. William P. Stephens
Ronald A. Michieli, Director, Gov't Affairs for Land & Nat'l Resources
National Cattlemen's Assoc.

20-1 See Response 12-1

20-2 Map 2-7 shows density and distribution of deer in the ES Area. These data were taken from the New Mexico Department of Game and Fish, Comprehensive Plan, Part 2, 1978.
On allotment 297, of the 37 AUMs apportioned to wildlife, 19 were from the unsuitable range and 18 from the suitable range.

20-3 The proposed livestock reductions are based on a range survey (1975-77) (See pp. A-8 and A-9 which explain the methodology for the survey). Reductions were not based on range condition, nor did range condition have a direct effect on proposed livestock numbers. The range condition method compared present vegetation with predicted climax vegetation. Factors developed are based on quality and amount of plants which make up the composition, not solely on the amount of a species in the composition. A range survey is concerned with the amount of forage which can be utilized with proper levels of grazing, of all forage species present.

United States Department of Agriculture

Soil Conservation Service

Box 2007
Albuquerque, NM
87103

May 4, 1979

21

Mr. Arlen P. Kennedy
Bureau of Land Management
Socorro District Office
Box 1217
Socorro, NM 87801

Dear Mr. Kennedy:

The New Mexico State Office received a copy of the Draft EIS - "Grazing Management in the East Socorro Area" on March 19, 1979. We have not initiated any field investigations but have utilized published and interim SCS resource materials and procedural references in reviewing the draft. The basis for our comments is the material contained in the draft itself, including the appendices.

Our comments identify the page and subject which we are addressing:

Pages 1-9 & 1-10 Flexibility

21-1 We do not believe that seven days' flexibility, based upon phenology variations, is realistic, and we suggest that more realistic move dates be set by the degree of forage utilization, rather than calendar dates. We also suggest that rigid grazing schedules do not allow for the usual extremes of rainfall patterns which characterize these resource areas.

In the Southern Desert Resource Area, experience and published research indicate that a degree of use not to exceed fifty percent on key plant species; allowing for a maximum of ten percent flexibility, will provide for improvement in range condition. We question if seventy percent total utilization is in fact a proven method of improving range condition.

Page 1-11 Federal Programs - SCS

21-2 This statement completely ignores the national and state coordination agreements between SCS and BLM for providing planning assistance where private and state lands are intermingled with BLM lands. Please correct this omission in the final EIS.

Page 1-13 State Programs - Local

We would like the statement describing the role of the Districts to be more positive and to strongly emphasize their role in representing private landowners.

Pages 1-14 thru 1-22 Description of Alternatives

While we will not comment in depth about each of the proposed alternatives, we will make these general comments. Although seventy percent of the rangelands are described as being in fair or poor condition, these lands do have potential for long term improvement as a grazing resource. We think that the selected alternative should result in these lands improving to good condition. We believe that the livestock industry should continue to utilize the renewable grazing resources, allowing for wildlife and feral horses.

Page 2-2

We question the assumption that the range trend is uniformly stable over the ES area.

21-3 It appears that the methodology utilized in determining range condition (as summarized in Table A-6, page A-41) is in error. Explanation of methodology on pages A-40 and A-41 indicates that plant composition was determined by Pace Transect (A-8). The SCS procedures for determining range condition (A-40-41) refer to the 1976 SCS Range Handbook. This procedure will produce valid results only when plant composition is based upon percent composition by air dry weights, determined by weight-estimate procedures.

No. 5 - Page 2-6

21-4 The map indicating Major Land Resource Areas is in error in that the boundary delineating the SD-1 and SD-2 areas was omitted. There are large vegetative composition differences between range sites which occur in both resource areas, and unless this distinction is observed, gross inconsistencies can occur in calculating range condition or in predicting forage production. We are attaching a corrected MLRA map and description.

21-5 It should be noted that references to the SCS 1962 Range Guides are very much out of date. We will be happy to provide current Technical Range Site Descriptions, as they are developed and field tested, for use throughout the period of applying the intensive grazing management programs.

Table 2-2 Responses of Vegetation

We are not at all sure that the combination of BLM vegetative type classification with Range Site descriptions is a valid way of presenting these data.

21-6 Page 2-32 thru 2-34 - Vegetative Production

The discussion of potential production, including Table 2-2, which is anticipated under the various treatment alternatives was derived by combining parts of BLM and SCS procedures. We would like the final EIS to clearly state that this use of SCS material is not according to SCS Handbook Procedures.

21-7 Page 2-28 - Vegetative Potential

The values for vegetative production, Column P of Table 2-8, as referenced to SCS Soils Form 5's, are not a reliable reference source for establishing animal unit factors or carrying capacity determinations.

Form 5 is used to record and enter into computer storage soil data and interpretations. Forms are revised as data accumulates. Information from Form 5 can and should be modified for local use. We suggest that the primary intent of Form 5 data be fully clarified in the final EIS.

21-8 Page 2-37 Soils - Existing Environment

This lead statement should state that the soils of the ES area have not yet been correlated.

Table 2-8

There appears to be typos throughout the table. Example page 2-41, 451 Nehar WP-3, column G should read 0.02-.6.

21-9 Page 2-56 Wind Erosion

The writeup should clarify that WEG's were developed with the soil in a non-vegetated condition. Column K of Table 2-B would become more meaningful if ratings would reflect various vegetative cover conditions.

21-10 Page 2-64: 1st column; 3rd sentence

"Peak rates of runoff and peak flows..." are synonymous. Suggest changing to "Peak flows...." or "Runoff volumes and peak flows......".

21-11 Page 2-64: 1st column.; 2nd paragraph; 1st sentence

Change the first sentence to better define infiltration. Suggest changing to "Infiltration is the flow of water through the soil surface."

21-12 Page 2-69; Table 2-14; column under "NA/FE"

Forage utilization and grazing pressure should be changed from "40 - 60%, moderate" to "60 - 80%, heavy" to agree with "No Action Alternative" definition of page 2-7, col. 1.

Appendix 4, page A-78, Table A-22

FHWA flows should be double checked - typo may have occurred.

21-13 Page 2-100 Map 2-8

Antelope presently occur on the eastern side of the Sevilleta National Wildlife Refuge. The map indicates they do not occur.

Page 2-105 Aquatic Habitat

Correct spelling to FATHEAD minnow.

21-14 Page 2-107 No grazing Alternative.

The discussion should indicate the response of big game to the loss of waterings, which presumably would be removed.

We appreciate the opportunity of commenting on this proposal.

Sincerely,

A W Hamelstrom

A. W. Hamelstrom
State Conservationist

cc:
Joe G. Batson, AC, Las Cruces AO
Cary Hull, SRC, NMSO
Bobby Dow, DC, Socorro FO
James C. Powell, RC, Las Cruces AO

21-1 The seven days of flexibility on either side of a moving date is used as a starting point. It is also the period of time in which the allottee need not contact the BLM when moving the cattle. Page 1-10 discusses flexibility based on phenological development of the key species and allows for additional flexibility. The BLM cannot allow unlimited flexibility in moving dates because of its responsibility for management of the public lands.

21-2 Text has been changed to reflect the role of SCS (See Chapter 1, the Soil Conservation Service section, p. 1-11).

21-3 The section on range condition, p. A-40, has been changed to more clearly show that the method used was not the true SCS Method but a variation of that method developed by BLM. Several contacts were made with the SCS, NMSU, and various BLM personnel concerning the methodology used.

21-4 Map 2-2, p. 2-6, has been changed to reflect the comment.

21-5 Changes made in text to reflect correct reference dates (See pp. A-40 and R-6).

21-6 See change on page A-44.

21-7 We did not use vegetative production data from Form 5s to establish AUMs or grazing capacity determinations. Column P displays values of potential productivity for soils of a normal year. The values used were checked and/or adjusted by the local SCS range conservationist on the Socorro Soil Survey file copies of the SCS Form 5s.

21-8 See text change, p. 2-37.

21-9 The suggested statement has been added to the Wind Erosion section of Appendix 3, p. A-72. WEGs were not used to quantify wind erosion. They were placed in Table 2-8, column K, to display soil blowing hazard rating based on erodability classes.

21-10 Changed wording to "Runoff volumes and peak flows..." (See p. 2-64).

21-11 The sentence in question was deleted as a definition very similar to the one suggested is provided in the Glossary.

21-12 Changed to "60-80%" as suggested (See p. 2-69).

21-13 Map 2-8 has been changed to reflect your suggestion.

21-14 The No Grazing Alternative would maintain all developments necessary for the wildlife program (See Description of the Alternatives, Chapter 1). The waters would be maintained; therefore, there would be no impacts to big game.

THE NEW MEXICO NATURAL HISTORY INSTITUTE
A Nonprofit Corporation
Box 369, St. Johns College
Santa Fe, New Mexico 87501

22

5 May 1979

Arlen F. Kennedy, District Manager
Socorro District
Bureau of Land Management
P.O. Box 1217
Socorro, New Mexico 87801

Dear Mr. Kennedy:

Thank you for opportunity to comment on the East Socorro Grazing Environmental Statement. It seems to take a big step in the direction of bringing these lands under rational management.

Where much of the land is badly overgrazed it seems right to allow recovery for a time. Further, we favor protection of riparian habitat including restoration of some significant stretches of stream valleys to something like their natural condition. Therefore we favor Alternative 5 of the Environmental Statement ("Enhancement of Sensitive Resource Values")--although its special provisions for wild horses are of little or no interest to us. To avoid undue economic hardship a compromise between the Proposed Action's 30% decrease in stocking and Alternative 5's 52% decrease might be best.

We question the piecemeal approach to planning: it would seem better to consider other important uses of the Statement Area along with grazing. Of course already-existing management plans are recognized in the Grazing ES and are treated in Table A-3. But since the Management Framework Plan from which those plans come was prepared in 1976, new directives have appeared in the Federal Land Policy and Management Act. Of chief concern to this Institute: the Environmental Statement pays no attention at all to Areas of Critical Environmental Concern; but the Act (Sec. 202; see also Proposed Planning Regulations of December 1978, Sec. 9) requires that priority be given the identification and protection of such areas.

In the Statement Area we propose as Areas of Critical Environmental Concern at least the following:

Allotment	Area
002	Tecolote Badlands.
002	live stream.
059	Rio Salado canyons.
065	Carrizo Arroyo fossil site(s).
129	A several-thousand-acre sample of the unique vegetation complex and scenery of the Petaca Pinta area, including both flat and precipitous areas. Erosion is particularly serious here.
256	Carthage Fossil Area (unless already protected as a Research Natural Area, as proposed in the management framework plan).
268	Nogal Canyon area, for wildlife and vegetation.

261, 277, 279 Elephant Butte Marsh and northward, west of the upper basin of Elephant Butte Reservoir, for birds and other wildlife and valley-bottom desert scrubland; and to correct especially serious overgrazing.

293 An enlarged Soaptree Yucca area including part of the adjacent malpais as a scientific study area for malpais and desert vegetation.

Treatment of these as Areas of Critical Environmental Concern would in most instances affect permitted grazing. We think that, if the requirement that you give priority to such areas is to mean anything, you should consider these areas now before locking the grazing plans into new allotment management plans.

We omit San Lorenzo Canyon--to be an Outstanding Natural Area--and the Ladron Mountains from our list because we assume that they and other areas in the wilderness inventory will be adequately protected under those headings.

Members of the Institute have not made any general study of the Statement Area; our comments come from casual acquaintance with the lands and from our files. No doubt ground survey would reveal other areas of biological or geological concern. We can only hope that the Final Statement identifies and meets such problems.

Sincerely,

Roger S. Peterson
Vice-President

22-1 ACECs have been identified as resource protection classifications or designations in FLPMA; however, the policy on use and designation of ACECs has not been finalized. The identified areas may require special management to protect identified significant resources. In future up-dated planning efforts ACECs or other special management designations may be made. The impact of these designations on grazing are not known and will vary with the extent of the grazing impact and nature of the significant resource. If there are any conflicts between grazing and any identified ACECs, these will be resolved through the planning process.

FORD MERCURY

MONETTE FORD, INC.
Post Office Box D Ph. 835-1190
SOCORRO, NEW MEXICO 87801

May 4, 1979

23

Mr. Arlen Kennedy
B.L.M.
P.O.Box 1217
Socorro, New Mexico
87801

Subject: East Socorro Grazing Environmental Statement

Dear Mr. Kennedy:

As a businessman in Socorro, I am very much concerned about the economic impact a reduction in grazing permits will have on the economy of the city and county of Socorro. Our economic foundation is very much dependant on our ranching and farming interests. A business person does not want anyone shaking the economic foundation of his community.

As a friend, associate and neighbor of a number of ranchers, I feel a hurt for them when I hear that they are about to be forced to curtail their ranching operations and consequently, their standard of living from thirty to sixty percent.

As a freedom loving citizen, it bothers me when I see us slowly but surely losing our freedoms and becoming more and more controlled by our government. There does not seem to be anyone who has the answer to this problem. We seem to have a disease that we cannot find a cure for.

Whereas I feel that it is very important that I write this letter, it bothers me that I do not fully understand the problem. I cannot understand how we got to where we are today. I do not understand how a person who spends days, weeks or even months on a person's ranch can know more about that ranch than the person who has lived there from twenty to seventy years. I cannot understand why so little

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FORD MERCURY

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time was given to the ranchers to study this statement, when it is going to have such a drastic impact on the ranching business now and forever.

Is it the feeling of our government that the ranchers don't know what they are doing and that they are trying to use up the vegetation on their ranches as quickly as they can so that they can starve the country, go broke and go out of business? Is it the feeling of our government that these people no longer want to work day and night to improve their ranches? Is it the feeling of our government that the rancher no longer wants to leave a better ranch to his children and grandchildren than he received from his father or grandfather? Is it the feeling of our government that the rancher is becoming so ignorant that without government intervention he will not survive?

Yes, as a businessman I feel myself and a lot of others will be hurt!! But as an individual I feel I am losing much more because when the government finishes with the rancher I might be next. They probably know how to run an automobile business better also. They might even know that if I have to sell thirty to sixty percent less cars that people will use less fuel. They might even know that if I sell thirty to sixty percent less cars that the air might be polluted a little less.

What they probably don't know is that if we all do thirty to sixty percent less that there would be thirty to sixty percent less taxes paid and hopefully, thirty to sixty percent less people telling us all how to run our outfits !

Sincerely,

Charles H. Monette,
President

CHM/sf

Central New Mexico Audubon Society
POST OFFICE BOX 30002 — ALBUQUERQUE, NEW MEXICO 87190

3 May 1979

24

Mr. Arlen P. Kennedy
District Manager
Bureau of Land Management
Socorro District Office
P.O. Box 1217
Socorro, New Mexico 87801

Dear Mr. Kennedy;

I would appreciate it if I could have an extension of 10 days for preparing our comments on the East Socorro Grazing Draft Environmental Statement. I would like to discuss the DES, in particular Tables A-12-18, with you before preparing my final comments. Unfortunately I have not had the time in recent weeks to drive down to Socorro to meet with you and the earliest day available at the present time is May 14. Is this day ok with you.

I would like to take a look at copies of the Ladron and Stallion Planning Area Analysis reports. As I was unable to find copies in the University of New Mexico library, I would appreciate it if you could let me know where I might find copies available in Albuquerque or could you possibly send me copies. If you send copies, please send them to my home address; 1800 Vassar NE, Apt. B, Albuquerque, NM 87106. Thank you.

Sincerely yours,

David E. Lange
President

MAY 3, 1979

25

DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT
P.O. BOX 1217
SOCORRO, NEW MEXICO 87801

RE: EAST SOCORRO ENVIRONMENTAL IMPACT

TO WHOM IT SHOULD CONCERN:

25-1 AS A CITEZEN, TAXPAYER AND OWNER OF A GROCERY STORE IN SOCORRO. I WOULD LIKE TO ASK WHY THE BUSINESS PEOPLE AND LOCAL CITIZENS WERE NOT ASKED OR BETTER INFORMED OF THE E.I.S. SINCE IT WILL DRASTICALLY EFFECT NOT ONLY SOCORRO COUNTY BUT THE WHOLE STATE OF NEW MEXICO.

ALSO I WOULD LIKE TO KNOW HOW GROUPS SUCH AS SIERRA CLUB, ENVIRONMENTAL PROTECTION ASSOC. ETC. WHO COME UP WITH SUCH NOTIONS SUCH AS "LUXERY TAX ON GRAIN-FED BEEF" OR MAKE STUDIES ON THE BURPING OF COWS WHICH THEY THINK IS POLLUTING THE AIR COULD FORCE THE U.S. GOVERNMENT TO COME UP WITH AN IMPACT STATEMENT IN TWO YEARS THAT WOULD EFFECT SO MANY LIVES AND EVENTUALLY CRIPPLE THE STATE OF NEW MEXICO. AND TO TOP IT ALL TO GIVE THE RANCHER'S AND CONCERNED CITIZENS 45 DAYS TO ANSWER.

WHO COMES FIRST IN THESE HERE UNITED STATES OF AMERICA - BIRDS BEES, TREES, DOGS - OR THE TAXPAYING, HARD-WORKING AMERICAN CITIZENS? ? ? ?

DON HUEBNER
HILLCREST GROCERY STORE
801 HIWAY 60
SOCORRO, NEW MEXICO 87801

XC: PRESIDENT JIMMY CARTER
SECRETARY OF THE INTERIOR
SENATOR HARRISON SCHMITT
CONGRESSMAN HAROLD RUNNELS
CONGRESSMAN MANUEL LUJAN
SENATOR PETE DOMENICI
GEVERNOR OF NEW MEXICO - BRUCE KING

25-1 Input from permittees and other members of the public was sought on various occasions. Five public meetings were held concerning the land-use plans that were the basis of the Proposed Action. Permittees were notified by letter that range survey crews would be conducting vegetative inventories on their allotment. Those permittees who requested to be notified of the survey date were contacted. On May 5, 1978, all permittees were invited to inspect the results of the range survey. During the fall of 1978, permittees were again contacted about the proposed livestock adjustments and AMPs.

Not all permittees were contacted when AMPs were being developed because of time constraints. If a decision is made to implement AMPs, the BLM will consult permittees as required by the Public Rangelands Improvement Act of 1978.

Other contacts that were made in the process of writing the ES are discussed in Chapter 4, Consultation and Coordination.

ARVILLA KNIGHT PROFESSIONAL RECORDS MANAGEMENT
DIVISION OF T. E. I.
207 FISHER
BOX 482 SOCORRO, N. M. 87801
505-835-0963

26

May 4, 1979

Department of Interior
Bureau of Land Management
P.O. Box 1217
Socorro, N.M. 87801

Gentlemen:

A large number of my clients in this area are ranchers and my clients and I are very concerned about the environmental impact statement released for the east Socorro area. If this policy would be enforced, one does not need to be a ranchers to see the drastic effects that this could have, not only on the ranchers, but also on the entire economic structure of our whole area.

I encourage those responsible for this statement to re-evaluate their position and to conduct new studies which will be, hopefully, of a benefit to the area instead of the detriment that is now being faced.

Sincerely yours,
ARVILLA KNIGHT P.R.M.

Alex Thyssen
President

COOPERATIVE EXTENSION SERVICE
NEW MEXICO STATE UNIVERSITY
BOX 3AE, LAS CRUCES, NEW MEXICO 88003
COLLEGE OF AGRICULTURE AND HOME ECONOMICS

27

May 4, 1979

Arlen P. Kennedy
District Manager
Bureau of Land Management
P. O. Box 1217
Socorro, New Mexico 87801

Dear Mr. Kennedy:

We appreciate the opportunity to comment on the East Socorro Grazing Environmental Statement. The Bureau is to be commended on their attempt to survey, record, and complete the Environmental Statement in the time period that was available. However, we feel that the time allowed for public input is entirely too short. An extension in time should be allowed in order that the Bureau of Land Management might receive the type of public input that will assist in revising the final document into an acceptable statement. The Bureau has been working on the Environmental Statement initiating with the inventory in August of 1975 and issuing the draft statement on March 16, 1979. Consequently the public has had only fifty-two (52) days to review and digest the material and try to put it into some sort of perspective. Because of this limited time, our comments are not as complete and as well organized as they could possibly be. We are more than willing to work with you concerning our comments.

The following comments are intended to be directed at the processes and methods in the draft statement, and are not directed toward any one individual or individuals within the Bureau of Land Management. When individuals or an organization expend as much effort and time in a project such as this Environmental Statement, any criticism of the statement many times is confused with criticism of an individual or organization. We trust that these comments will be received in the light of addressing the process and not be taken personally by anyone within the Bureau of Land Management.

These comments were prepared by: Jerry G. Schickedanz, Gary Donart, John Fowler, Kirk McDaniel, Rex Pieper, Jim Tiedeman, Karl Wood, and Phillip J. Zwank.

Respectfully,

Jerry G. Schickedanz
Jerry G. Schickedanz
Coordinator
The Range Improvement Task Force

JGS:dra

Enclosures

AN ANALYSIS OF

THE EAST SOCORRO GRAZING ENVIRONMENTAL STATEMENT

by

Range Improvement Task Force

New Mexico State University

One of the major problems concerning the East Socorro ES and the Allotment Management Plans included is that there is not sufficient information available to support some of the proposed actions. There was simply not enough time to plan and develop 79 AMP's for this area. However, rather than recognize this fact and present the information which is available, the BLM has apparently chosen to make decisions and take actions without adequate information. The BLM was under court order to develop Environmental Statements, but was not required to develop specific action programs without adequate background. Parts of the ES provide an excellent base for initiating planning, but other parts appear to contain obvious errors. The BLM is charged with considering many uses, but there is no way to insure that some of the proposed plans will not detract from the very uses they are intended to enhance. The BLM must move carefully to insure that problems are solved rather than new ones created.

While these comments are critical in nature of the ES, the intent is to make them constructive so that the BLM can present the most factual Final Environmental Statement. Although it may be nearly impossible to correct all the deficiencies in the short time before the final copy is due, efforts by the BLM should be directed toward protecting all the resources under its jurisdiction.

Vegetation Typing and Mapping

Types are delineated on the maps. The definition of a range type is not equivalent to a range site (see Glossary).

27-1

Soil overlays were superimposed over the range type maps to classify the types into range sites. This procedure is not ecologically sound. A single range type of a low successional stage can occur on various soils and range sites or one soil may support many different vegetation types. For example, creosotebush may dominate a sandy, shallow sandy or limestone hills range site. The third order soil survey map is composed of soil associations of two or more soils. This may be of two different range sites. Soil overlays are superimposed over types and then fitted into a range site. This is a forced fit and infers that forced range site terminology is applied to soils mapping unit. The soil units are associations or complexes in order through survey. More than one range site may occur per soil map unit as sites correlate to the taxonomic unit or at least the series level.

If the vegetation type can occur on either range site, how can the soil overlay superimposed over range type maps be used to determine the range site for the range type? It could be either range site.

This is a critcal problem in that errors in range site mapping will result and be reflected in range condition classification, carrying capacity adjustments and potential or long term projections.

27-2

Soil mapping units are preliminary and not finalized. Many are subject to change or have already been changed. Surveys are not final until late manuscript stages (final correlation).

A second order soil survey would provide a direct correlation to range site, but cannot be done directly using third order soil survey in-

formation. Pages 2-38 and A-60 show information on range sites as correlated to soil mapping units and list the percentage of a series within a unit. It is assumed that the dominant series carries the soil type to a series name. This means that soils and/or range sites may be erroneously included or missed.

27-3 Several series listed in table 2-8, i.e., orthents, are not series, therefore column A is mislabeled.

From the attempt to force range sites and soil units together one is left to doubt the validity of mapping. Range sites are definitely averaged over the soils for the entire area.

27-4 Further problems in range type and subtype delineation appear on page A-13 (Table A-4), column 1 and 2. To what do the range type numbers refer? What is a vegetational type in column 2? How can vegetational type 1 occur in 12 different range type numbers? Two range type numbers are considered equivalent to one range site (p. A-43).

27-5 Are all the range types in the allotment that fall within one range site grouped together and species composition averaged across all the range types?

27-6 The procedure (Figure A-7) cannot be determined from the preceding paragraphs. If this is how species composition was determined, problems in range condition classification will result. For example, one range type area may have poor range condition, but when averaged with range types in good or excellent condition, the entire area would be classified as all in good condition. If range types are not averaged in proportion to area occupied, small areas may affect calculations.

Without strong definition and discussion, it must be assumed that range condition is confounded across range sites. Such would negate current condition and future predictions. Figure A-7 is not a comparison of

range site guide and range type write up. Rather, it shows that BLM range type information is different from SCS site guide information. The figure illustrates the use of an SCS range condition technique using species composition on a weight basis with BLM survey data of species composition on a cover basis. The BLM was asked not to do this in June 1977, when they submitted similar information by letter for review.

Composition based on cover does not correspond to composition based on weight or all species. Cover values will favor low growing, spreading plants which are often low in succession thus resulting in an artificially low condition rating.

27-7 The range sites used are not from SCS (1962) as referenced. Origin of range site descriptions used is uncertain, but they appear to be from a draft which has been misrepresented in the ES. (Range site description in BLM letter of June 8, 1977, showed a range of values for each species which has been omitted on page A-43 where only absolute values are shown. The upper limits were used and condition classes are lowered as a result.)

27-8 Also, all of SD MLRA cannot be lumped into one category as is done on page A-43 (Table A-7) and elsewhere (A-60, map 2-2, 2-38 Table 2-2, etc.). The reason for this is assumed to be that range site descriptions for SD-1 (northern portion of Socorro ES were not in available draft form in 1977 so SD-2 descriptions were used for the entire area. The sites within SD-1 are considered different and distinct from those of SD-2. Use of SD-2 descriptions throughout creates an error as it is a warmer, drier area with different vegetation. Furthermore, these site descriptions have been changed at least once since 1977 and are still in draft form.

SCS range sites should have been used if they were properly delineated and BLM's range condition concept as used in the Rio Puerco ES should have been retained. This would have allowed for direct interpretation of cover data.

Field Methodology and Calculations

Basically, there seems to be nothing wrong with the field procedures for collection of cover and composition data from the range survey. However, users of such information need to be aware of the limitations. Calculations of stocking rates by methods used in the ES involve three independent estimates each associated with a certain error: cover and composition determinations from the range survey, proper use factors and forage acre requirements. When all of these are used in stocking-rate calculations, the results may or may not be realistic

Two transects were sampled in a representative area. Is this per allotment? What are the ranges and variability of data?

27-9 What is the source of the PUF data? Distributed information of 1977 shows the PUF values to be from a March 1977 dated source. Are these values developed from experienced observations and study? Many of the values seem low, especially for annuals which may provide much forage and be heavily used in a given season.

FAR's are a very complex calculation and only valid for estimations. FAR must represent an estimate for similar areas. This includes condition, potential and management. Six AMP's were chosen to represent three general areas. Five of the six have existing AMP's but not necessarily the same as proposed for other areas. All show proper stocking level as no reductions were indicated. However, five of the six are in SD resource

area as per Map 2-2. Proposed FAR's result in underestimates of carrying capacity for more productive MLRA's. Various vegetational types are not represented and all calculations are computations of an average for the vegetational types in the allotment. Range condition is not considered at all. What allotments are computed against which FAR's? Such calculations may give a functional average for the entire area (1.3 million acres), but validity for a given allotment is purely coincidental.

27-10 Elsewhere in the ES, it is stated that actual use is not known. This seems doubtful and FAR calculations shown indicate a known actual use.

Originally, the ocular reconaissance method was intended to provide trial stocking rates, and not to be a basis for adjustments in stocking rate. The BLM Ocular Reconaissance Forage Survey Handbook (BLM Manual 4412.11A, 1963) states, "Capacity estimates are valid only at the time the survey is actually conducted and are properly used only as a starting point in management." The second paragraph in the Manual states, "They will be used primarily for initial adjustments in stocking rates on ranges which have not been subjected to reliable forage production or grazing capacity studies, and for equitable allotings to users and proper distribution of grazing use." Such surveys, when conducted only for one year, are not very sensitive and can hardly serve as the basis for stocking rate adjustments when "trial" stocking rates have been in place on these allotments for many years. These surveys may serve to "flag" allotments where situations need close scrutiny. Survey information is vital to monitor changes in range condition or trend which can then be used as a basis for stocking rate adjustments. Surveys conducted on the East Socorro Area followed some rather severe droughts. The survey conducted from 1975-1977 may not be sensitive enough to identify allotments which

need reductions or those which could handle increases. The problem of correct stocking on New Mexico ranges is complex and should involve the basic stocking plan (i.e., whether to stock at fully capacity and vary stocking with herbage production, whether to stock below capacity to prevent damage during drought years, etc.) and be based on several factors such as trend, utilization, etc.

27-11 There is considerable confusion in the ES concerning use of the terms "density" and "cover". This confusion stems from usage dating back to the old "square-foot density" or "point-observation-plot" method where "density" was used incorrectly to denote cover. Continued use of "density" to mean "cover" can no longer be accepted. The article by Cooper (1959, J. Range Manage. 12:215) clearly distinguishes between the two. Density should only be used to refer to the number of individuals (plants, shoots, etc.) per unit area. The ES is especially confusing because density and cover are often used in the same heading (page 2-38, Tables 2-1, A-12, A-13, A-14, A-15) and when density is not defined in the Glossary. (Plant density is correctly defined as the number of vegetation individuals per unit area.) Unless the reader can find the one page where these terms are explained, he may not be able to understand these sections. Such inconsistencies only serve to undermine the credibility of the data.

27-12 The statement on page A-8 stating that the survey procedure was that of the Ocular Reconaissance Forage Survey Method is only partially correct. The manual 4412.11A does not describe the point-step procedure which was actually used to determine composition and cover. The point-step procedure is a more objective procedure than the estimation method described in manual 4412.11A and should be more reliable.

Rangeland suitability is designated by arbitary standards. In January 1977, NMSU responded to limitations of such standards and felt production emphasis was arbitrary and confused with proper stocking. Areas of 49 acres per AUM have been effectively grazed without harm for the last 20 years. The SSF is a biased rating of soil conditions and can be easily altered by 20 points, either in interpretation or absence of specific criteria to occur which may create a penalty when none is justified.

The SSF has too many subjective measures inherent in Form 7310-12. For instance, how can a zero rating have four possibilities, i.e., from zero to three (0-3) for no visual evidence of rills? This comes into play in an example (2) on the back page of the form. Surface rock and gullies were indicated as not present so the values of the possible factors were not taken into account. In this example, the SSF is determined by dividing 45 by 71 which equals 63%, a critical erosion class. But if one (1) was entered for both surface rock and gullies, the resulting answer would be determined by dividing 47 by 100 which equals 47, or a moderate erosion condition class. This is a full condition class lower with just a slight change in the input. Under the suitability criteria, the critical erosion class would be closed to grazing. Much care must be taken when interpreting these erosion condition ratings or large scale misinterpretation may result.

The Soil Surface Factor dominates the criteria used in Figure A-5 to determine range suitability. This appears to be excessive dependence upon a subjectively derived factor with questionable reliability as described earlier.

The 50% slope criteria may be too low for some areas, but not high enough on other areas. Livestock graze more on short, steep slopes than long, steep slopes. Livestock graze either more or less on steep ter-

rain depending upon the relative proportion of the allotment that is steep.

Most problems with rangeland suitability relate to livestock distribution and overstocking.

Long term predictions cannot be made from a mathematical mean of favorable and unfavorable years. First, the favorable and unfavorable year production values are estimates and second, they do not occur in equal abundance (see page 2 of information distributed June 8, 1977).

How was the relationship between a 1% increase in vegetation caus-
27-13 ing a .2% increase in acres of a range condition class determined? Is the vegetation increase, in terms of biomass, cover or density? The prediction of future range condition is beyond the capabilities of our
27-14 present technology. The assumption that an increase in AUM's of forage will result in an increase in range condition is not correct. Improved
4-37 range condition is a change in species composition toward that of the potential climax species composition. This is a species composition change not pounds of forage. Seral stages of vegetation may produce more forage biomass than the climax stage.

Table A-8 averages and weights PUF for variable amounts of species with different PUF. This will given an estimate of the situation but not an absolute value.

Concept of key area monitoring is a valid approach and is worthy of pursuit. Areas of concern include the uncertainty of valid site mapping and interpretation. Example on A-47 refers to key areas and a vegetative subtype HT-40 which is not identified, but the Glossary definition says is an area similar in aspect. This does not constitute a range site! Why not determine the true range site and manage to an accepted level of

improvement in range condition for that site? Information presented states that key and comparison areas were correlated to a sandy range site and integrated into prediction data. These predictions will be only as valid as the basic units of interpretation and these are confounded.

The BLM's management goal is described as bringing the rangeland to a condition similar to that of the lightly grazed or non-grazed comparison areas. This is historically representative of range management goals. However, a problem with this goal is that comparison areas may not support the best vegetation for a stable and productive ecosystem where grazing animals are present. Comparison areas support vegetation that has evolved to a climax or near climax plant species composition without livestock influence. These communities are more susceptible to damage by grazing animals than plant communities that have evolved to a stable state under grazing pressure. Management goals to reach a plant community similar to an ungrazed community is biased against the grazing animal. It would be better from a multiple use objective to use comparison areas where proper grazing use has historically been applied rather than comparison areas of no grazing history.

Further, page A-44 states range trend is stable. Stable trend would mean current stocking rate is not causing further degradation of the range.
27-15 The fact that a 24-year study of range trend is suddenly considered invalid (page A-44) when an ES is being prepared creates a lack of credibility in use of newly established comparison areas for trend.

Pages A-49 through A-56 present calculations which are impossible to evaluate in the time frame available and most are not of any accepted process. The tables from which data are generated create an initial problem. Data from areas with no similarity to the study area are aver-

aged and then applied to the study area. Most studies present comparisons of grazing rates and comparisons of continuous grazing with a system. They do not show vegetational changes, only comparisons at some points in time. Titles are, therefore, in error as are the implications. Tables
27-16 A-12, A-13, A-15 and A-17 combine data on true density, cover, litter, standing dead, etc. How can such non-additive information be averaged?

From information presented on pages A-54 to A-56, no interpretation of the validity of the enhancement of sensitve resource value and no grazing alternative is given. On page A-54, does 0.5 come from Table A-16,
27-17 page A-57? The value 0.22 comes from table A-14, but 0.74 comes from a projected value in the text. Why the change in source? From the limited time for interpretation, the process appears confounded by errors at least in validity of original field data extrapolated through a range site, vegetation type, range type, soil mapping unit interface, averaged for 1.3 million acres and compared against data not collected in a comparable manner or from comparable areas through an unknown calculation that has no known basis. Is the answer valid, and if it is valid, is that coincidental?

Erosion

27-18 Page A-72 presents information on Wind Erodibility groups. Are these processes adjusted for rangeland conditions? The basic concept is for cropland.

The following specific comments are made with regard to the PSIAC method (page A-73):

Surface Geology. Soils with a high clay and high organic matter content may have a lower sediment yield than an unstable silty soil. Therefore, texture, when considered singularly, is a poor indicator of erosion -

this section is probably invalid.

Soils. Most all research indicates that infiltration and erosion are almost exclusively affected by the top 4". Therefore, this section is of questionalbe validity.

Climate. This section is questionable - there are too many storms which are not even similar to a two-year, six-hour, isopluvial storm.

Precipitation Intensity. This section is questionable because the runoff reductions are very questionable. They may be real, but the method used to determine them is questionable.

Topography. This section is questionable. How do the authors know that the relationship between erosion and slope is linear?

Cover. This section is totally invalid and unreliable. A soil having 60% cover of grazed black grama does not have the same erodibility as ungrazed giant dropseed - yet with this method, they receive the same value. The effects of coarse fragments are not fully understood. Some researchers feel that the coarse fragments concentrate the overland flow into channels between fragements which accelerates gully erosion. Others feel that the energy from concentration is more than compensated for by the energy dissipation from raindrop impact.

Land Use. How do the authors know that the relationship between utilization and erosion is linear?

Upland Erosion. The soil surface factor (SSF) methodology was never designed for use in estimating erosion quantitatively nor does it work well for that purpose.

Channel Erosion and Sediment Transport. The values for this section are so subjective they are nearly meaningless.

27-19 How was table A-21 derived? How were PSIAC and sediment production

values assigned to each other? The only way that this relationship between PSIAC and sediment yield could be valid is with many on-site measurements under all conditions and combinations listed from A through I.

Specific comments to calculations for watershed data (Page A-78) include selection of representative areas and peak flow methodologies.

Two representative watersheds from each major drainage basin were selected for extrapolation to all watersheds. Watersheds tend to be too variable for much extrapolation.

27-20 At least 30% of the watershed must be public land subject to the proposed action. The 30% allows for far too much variation as a result of 70% being on private land with many possible influential and detrimental land management practices.

4-39

Vegetative problems in the vegetative and hydrologic soil types in this section are similar to those in erosion. The use of hydrologic soil

27-21 types was designed for bare soils on croplands and has very little application in rangeland situations.

The information obtained from the Log Pearson Type III method is an estimate of peak flow for a 25-year return period. The validity of calculating a 25-year storm is questionable from data that are only 16 years old in areas that only experience 0.1 inches of runoff each year. When comparing the values derived from the SCS, modified SCS and FHWA methods to the Log Pearson Type III method, estimates are not being compared to real data, but to another estimate. The estimates may be close to each other or correlated closely to each other but not similar to real data. The r^2 values for correlation between methods is near perfect which are highly unlikely in watershed data. Contrary to the statements on page A-79, all three methods do not show a strong relation to a fourth

method of estimate of runoff from various flood return periods.

The SCS method may be simple, quick and easy, but is a poor choice of methods for calculating peak discharge.

Grazing Systems

Six grazing system are described on pages 1-5 and 1-6 but how the appropriate system was selected for each allotment is not described.

27-22 Rest rotation grazing systems with yearlong rest are recommended for pastures with browse species such as mountain mahogany, saltbush (presumably fourwing) and winterfat. Research (Buwai and Trlica, 1977, J. Range Manage. 30:164-71; Pieper and Donart, 1978, J. Range Manage. 31: 314-315) indicates that growing season rest may be all that is required to maintain fourwing saltbush in vigorous condition. Buwai and Trlica stated, "The present study indicated that fourwing saltbush should probably benefit from rotation grazing that would allow for complete rest during some growing seasons."

Research published (Miller and Donart, 1979, J. Range Manage. 32:63-67) and currently in progress indicates length of rest is not as critical as intensity of use or the environmental conditions in favoring black grama responses.

27-23 Flexibility has been well demonstrated as important in this section. However, seven days of flexibility on either side of a move is not sufficient considering climatic variations. Research in progress at NMSU shows more than 14 days variation in stages of phenological development on black grama between 1977 and 1978, which may or may not affect stolon development.

Simple, but flexible grazing systems may be the easiest to implement by the ranchers and may be all that are required to meet vegetational and livestock objectives.

Wildlife

The East Socorro Grazing Environmental statement has been reviewed from a wildlife standpoint and it appears that the authors have made an extensive literature search. Also, given the budgetary and temporal restraints, and the "state of the art" in wildlife population estimation techniques, the methodology used for estimating big game numbers appears to be adequate.

27-24 Forage allocation to antelope, however, does not reflect updated BLM forage consumptive rates as determined by Anderson and Denton (1978). (See information Memorandum No. DSC-79-66 from Director, DSC to All Field Officials.)

27-25 Also, on page 2-105, paragraph 6, it states that antelope must go under or through a fence. This statement is a little too strong because on rare occasions, antelope will jump over fences.

4-40

Endangered species, small mammals, avian species and riparian habitats appear to be adequately addressed.

The proposed action appears to be the best alternative for wildlife. The water improvements included in the Proposed Alternative, while identical to the Pasture Capacity Level Alternative, is superior to all other alternatives.

While the No Grazing Alternative allocates the most AUM's to wildlife, their numbers are not expected to increase appreciably under this alternative. Wildlife, therefore, would not appear to make optimum use of the forage. The forage could be better utilized by livestock under all other Alternatives,. The amount of AUM's alloted to wildlife does not differ significantly.

27-26 It is stated that deer numbers in the ES area appeared not to be impacted by livestock grazing. Why then are cattle numbers reduced at the

ratio of 1 for every 5 deer? Deer, antelope and cattle do not consume the same forage or use the same terrain. Competition for areas and diets do overlap to a varying extent depending upon the available vegetation and season but usually do not compete for 100% of the same plant species or areas. The proportion of competition should be determined if forage is to be allocated to each animal species.

Economics

27-27 Page 2 - 87. The logic applied for the inclusion of the private and state land into the base for those acreages and AUM's on the non-AUP allotments is not entirely justifiable. The dollar value changes are absolute magnitudes and should apply only to the BLM land areas. The income and AUM reduction figures are based on number associated with the area; these absolute reductions continue to occur and the regional income decreases or increases by the amount. The inclusion of the state and private lands is simply a cover-up of the real reduction on the BLM land areas. The issue is not that of how will the BLM carrying capacity reductions effect the ranchers income, but rather how severe is the reduction and can this reduction on the public land area be justified? The state and private inclusion simply reduces the magnitude and does not reflect the reduction on federal land.

27-28 Page 1 - 9. Benefit/Cost Analysis (B/C) typically suffers from the difficulty of quantifying some component of either/or both the benefits or costs. Only under this type of conditioned statement can B/C ratio of 1 or less be accepted. In terms of accepting projects, B/C ratios are typically used to rank project priorities down to, but not including unity. There is no economic justification for accepting a B/C ratio of 1 or less. What component of the 72 mentioned AMP's are in the .98 to 1.0

range? Unless ratio is greater than one, the dollar expenditure is not supportable.

27-29 Page 2 - 91. Indirect income and income reductions are not adequately reflected. Input-output models or some other multiplier is necessary to trace direct income reductions through the economy to get a handle upon the total magnitude of both direct and indirect income effects.

27-30 The data of Table 2.22 do not support the statement of impact of AU reductions. Non-farm income per ranch is the greatest for large ranches. Therefore, the percentage of reduction of total income for a constant reduction may well be less when the total farm and non-farm ranch incomes are considered.

27-31 Page A - 88. The original Southwest Research and Development (SRD) 1977 methodology and analysis seems to be potentially misused by the BLM. The grounds for this potential misuse stems from the adjustments made upon the SRD categories. When the SRD computerized budgets are changed in size, then this changes the efficiency of operation of the size category as well. The budget may not represent the category. The cost data used by the SRD was based on 1975 costs; 1975 was in the liquidation phase of the cattle cycle and may not adequately reflect the long-run circumstances.

Specific Comments

27-32 Page 1-1, Col. 2, Par. 2. The present grazing use is said to be 170, 697 AUM's, which is considered to cause 30% overusage. On page 2-77, Col. 2, par. 2, it is stated, "Actual livestock use data is unknown in much of the ES area." These conflicting statements should be resolved. If actual use is unknown, how can 30% overusage be identified?

27-33 Page 1-1. The statement should more clearly point out that with the proposed action the BLM is recommending in addition to a 31.6% livestock reduction on public land (from 104,678 AUM's to 71,600 AUM's), a 27.5% reduction on private land is proposed (from 66,019 AUM's to 47,865 AUM's).

27-34 It is also unclear if the BLM considers state lands and lands administered by the Bureau of Reclamation to be a part of their public land total.

27-35 It would be useful to have a reference map showing land ownership patterns in relation to allotments.

Page 1-1 reference to Table A-1. It is noted that 19 of the 25 existing AMP's would have livestock reductions (76% changed), and no existing AMP merits an increase in AUM's. The number of years the AMP's have been in existence is not given and would be useful information. The 28.7% overall reduction for existing AMP's (40,737 AUM's to 29,065 AUM's) suggests these plans to have been poorly conceived or originally thought out. For the 19 existing AMP's receiving reductions (-36.4% average), there appears to have been little advantage from having an AMP. The BLM should more fully recognize the risk of failure before implementing an AMP. The agency cannot continue to take the posture of knowledgeable land managers if plans continue to fail at this rate.

27-36 Page 1-5, Col. 1 (middle). The distribution of increases in vegetation production will be based on the needs of all the resources. How are these needs determined?

Page 1-7, Range Developments. There is no reference in this section, nor elsewhere in the ES, to the Public Rangelands Improvement Act of 1978. This Act (Public Law 95-514) was signed October 25, 1978, and provisions therein could significantly change many sections in the ES. The

bill establishes a 20-year, $360 million range improvement program, 80% of which must be used for on-the-ground range improvement. How the East Socorro district plans to use some of these monies should be outlined. The law requires an environmental assessment record to be made on each range improvement and should be referenced under project design feature 12 (page 1-9). The law further establishes a new grazing fee formula. Was the new fee taken into account when economic impacts were determined? According to the law, AMP's are discretionary and, if developed, must be done so "in careful and considered consultation, cooperation and coordination with the lessees, permittees and landowners involved, the district grazing advisory boards established pursuant to section 403 of the Federal Land Managemen Policy and Management Act, and any State or States having lands within the area to be covered by such allotment management plans." Have grazing advisory boards been established in the district? Have they been consulted? Is there cooperation on AMP's with the lessees, permittees and landowners involved? The State Land Office has indicated they
27-37 cannot incorporate State lands into BLM AMP's (page 1-13). How will this lack of cooperation be resolved? Because the BLM has assumed responsibility for private and State lands (by assigning carrying capacities for these lands) without the cooperation of all involved, it is unlikely that the proposed AMP's will succeed. Therefore, a different alternative perhaps the Livestock Adjustment Alternative, would be a better choice for the proposed action.

Page 1-7, Range Developments. It is somewhat surprising that revege-
27-38 tation and/or brush management are not proposed somewhere in the district. These practices are commonly used on private and State lands in the area. In the vegetation section (page 2-17), the point is made that sagebrush,

mesquite, creosote and other woody plants have increased in frequency and range condition has been lowered. This trend is no different from many areas in the Southwest and Great Basin region. Shrubs will continue to increase and range condition decline as the process of retrogradation continues. Brush management, coupled with integrated grazing management, has proven successful for expediting secondary succession and improving the condition of rangelands in New Mexico. Control methods (chemical, mechanical and fire) could be tailored to specific range sites and vegetation conditions. Grazing management and the other range developments proposed in the ES could not in themselves be expected to result in significant range improvement.

Page 1-9, Col. 2, Par. 2. Allotment evaluation is important if one is to understand the effects of management practices upon the allotment. Does BLM Manual 4413 prescribe a method of sampling changes in vegetation composition over time? Measuring apparent range condition trend every year is not adequate nor is comparing one condition class one year to the next. Actual species composition changes over time is necessary to document the effect of the applied grazing or management system.

27-39 Page 1-10, Col. 1, Par. 1. Does 70% utilization refer to the key species or to the average utilization of all species?

Page 1-10, Col. 2, Par. 1. How was it determined that three allotments have insufficient forage for livestock grazing? The Jornada Experimental Range has been successfully stocking their range at 49
27-40 acres/AUM for the past 20 years. The three allotments considered to have insufficient forage are presently stocked at approximately 10 acres/AUM. This is not in excess of the 32 acres/AUM standard in Figure A-5. It does not appear justified; according to these figures that there is insuf-

ficient forage for livestock grazing.

Page 1-10 Col. 2. Are range related positions the same as range trained?

27-41 Page 1-11, Private and State Land. The second paragraph paraphrases section 402(f) in FLMPA and does not give the full intent of this section. Either the entire section of the law should be given or this reference deleted. Specifically, the following was omitted: "The secretary concerned under appropriate regulations shall grant to lessees and permittees the right of appeal from decisions which specify the terms and condition of allotment management plans. The preceding sentence of this subsection shall be construed as limiting any other right of appeal from decisions of such officials."

4-43

27-42 Page 1-11, Reference to Section 402(f) in FLMPA. The BLM appears to have made very liberal use of what constitutes intermingled land and has proposed to adjust stocking rates without the consent of the permittee or lessee involved. What the BLM considers to be intermingled land is not defined. The BLM appears to be in violation of the law unless intermingled land can be given an adequate definition.

27-43 Page 1-11. Doesn't the BLM have a cooperative agreement with the SCS for planning on intermingled lands?

Page 1-14, Proposed Action and Alternatives. The justification for a reduction in AUM's cannot be substantiated without independent surveys. There is a margin of statistical error associated with all surveys, but none is indicated in the ES. However, assuming the survey is correct and livestock adjustments are necessary for all allotments, then an excellent case can be made for adopting the "Livestock Adjustment" alternative over the "Proposed Action". The main difference between the

Proposed Action and the Livestock Adjustment alternative is the adoption of the AMP. A basic assumption in the AMP process is that grazing systems proposed by the BLM are superior to those employed by a permittee on his own. Reductions to be made on existing AMP's do not support this assumption. There are several advantages to the non-AMP alternative (livestock adjustment). The permittee is allowed more flexibility in the day-to-day decision-making process. BLM range conservationists cannot, because of logistics, be expected to make the same quality of decisions with 79 new AMP's. The permittee would be in a better position to seek outside consultation and advice from other agencies (SCS, universities, or professional firms). The permittee would probably be able to design a system to meet the objective of improved range condition better and, also provide greater compatibility with his total operation. Additionally, the incentives with this alternative are greater. Range developments should still be implemented even if the grazing system in the AMP is not adopted.

27-44 Further, how can a "No Action Alternative" result in a reduction in existing grazing use? No action implies that nothing will be done differently from the present. This No Action Alternative does not agree with the No Action Alternative described in the BLM's Proposed Planning Regulations associated with the Federal Land Policy and Management Act where No Action is defined as "No land use change". The present land use or no change in land use should be considered as an alternative.

Page 1-15, Par. 6. What criteria is used to determine if vegetation cover is sparce or not?

27-45 Page 2-1, Impact - Assumptions and Analysis Guidelines. The state-

ment in paragraph 2, page 2-2, that allottees are operating at lower than existing use is not substantiated and should not be included. There may be an equal number of permittees above existing use.

27-46 Page 2-5. To use ecological potential and condition of MLRA's, SD-1 must be separated from SD-2. Also, FAR's must be calculated for each area.

27-47 Page 2-5, Vegetation. Barren and waste do not connotate vegetation types. These types should be considered separately as a non-vegetated category.

4-44 Page 2-7. Table 2-2 shows data for density (assumed to be actual plant cover since it is in percent) which is confusing. Why is density on grassland, SD loamy range site higher than for grassland, WP-2 loamy

27-48 range site? Similar situation occurs for other range sites including half shrub, CP loamy and half shrub SD loamy. Is this a function of data analysis, different range conditions or lack of alignment in range sites?

Page 2-17, Par. 2. Vegetation surveyed as waste often includes large areas of non-waste land, but complexity of mapping prevent their separation on maps. The percentage of the waste vegetation mapped that is non-waste should be estimated and AUM's adjusted accordingly.

27-49 Page 2-28, Vegetative Potential. Cover needs further definition, i.e., were measurements of foliar, basal or ground cover. Cover is expected to increase, but does this include woody as well as herbaceous plant cover? Predicting average changes in "density" and "cover" with increments from 1 to 3% over 20 years is not realistic when one considers potential sample error, year-to-year variation, etc. Changes this small are likely to be within a statistical range of variability and could not

possibly be measured.

27-50 The assumption that vegetation density, cover, production and composition would not be expected to increase on non-AMP allotments because public lands are intermingled with other lands and total livestock numbers are not set by BLM has no basis. The BLM should reevaluate this assumption, especially in light of the fact that proposed non-AMP allotments are generally in better range condition than existing AMP allotments, and require a smaller reduction in livestock (-26.5 versus -28.7%).

27-51 Page 2-29. Why are the percent changes in density different within the 25 existing AMP's for no action alternative and livestock adjustment alternative?

27-52 Page 2-31. How does one consider equal increases in black grama, dropseeds and galleta on bottomlands?

Page 2-33. An increased plant density does not have to result in greater production as the plants may be smaller in size.

27-53 Page 2-34. If major riparian areas are on private land, how can various proposed actions result in change of use when the no grazing alternative will not result in a change?

27-54 Page 2-37. A soil's susceptibility to water erosion is influenced by more factors than slope, permeability, subsurface restrictive layers, coarse fragments, soil texture and vegetative cover. Other factors which are equally or more important include strength and development of surface crusts, soil structure, organic matter content and vegetative production. Therefore, methods which do not use all of these factors to estimate erosion are very questionable.

Page 2-37. Petrocalcic horizons may also perch water and make it

more accessible for plant growth. This is what creates suitable growth conditions for black grama on Simona soils.

27-55 Page 2-77. Actual livestock use is unknown. If permittees are grazing fewer animals than they are licensed for, then current management may actually be better than is estimated. This should be determined.

Page 2-118. Wild horse populations and management are so unknown that proposed plans must be treated with considerable care. Will a wilderness designation have any effect on wild horse management?

Page 2-133 and Appendix 8. Criteria for visual resources are even more subjective than the SSF. The basic criteria are based on granduer and non-obtrusive situations. Such criteria are in the eyes of the beholder. Similarly, senic features may be a result of erosion which is contradictory to the ecological thurst of the ES.

Page 3-1. The summary for the 20-year use period indicates trade offs between improving the quality and/or quantity of natural resources. These trade offs are not guaranteed. Decreasing the total number of livestock and total income and causing a decline in the quality of the ranching life-style for the operators in the ES area is guaranteed. The BLM and the public are paying a small comparative price and should assume greater responsibility in the event of failure.

27-56 Page 3-1. Losses of grazing in short term and the ability to be restored in the long run is an interesting style of presentation, but isn't real. How can operator who has been out of business re-enter after 20 years?

Page 4-1. Team organization indicates no specialists in rangeland management were employed. Is this true? Also, it is indicated that livestock specialists were part of the team. Is this true?

Page 4-2. Did the BLM utilize any of the assistance offered by the SCS in developing range management plans?

27-57 Visual C is a map of range sites rather than soils.

27-58 Visutal B identifies 14 vegetation types, while at least 17 types are inferred in Figure A-17.

Visual D is a map showing range improvements. Many of the proposed water developments such as pipeline initiate from water on private land. Have these types of improvement practices been approved by the owners of the water developments? Is there a possibility of a private landowner supplying water to the public land being held responsible for keeping that supply of water in the future?

Table A-3. This appears to be the Management Framework Plan complete with decisions. Does this relate to information in the ES, or is it a separate process? From information presented, it is apparent that livestock are the most affected in resource trade-off.

27-1 Contacts were made with the SCS, NMSU, and various BLM personnel concerning the methodology used. The general consensus was that this was the best available way of estimating conditions in the ES Area. Due to various factors such as time, it was decided to proceed with the data and methodology shown in the Appendix of this ES.

The methodology was not used to determine proposed use. The range survey was used to set initial stocking rates (See Appendix 1 beginning on p. A-8). The methodology in question was only used to determine range condition classification and long-term projections.

Personnel working on the methodology were knowledgeable of range sites and soils.

We were aware there were inclusions but these have lost their identity on the scale of the visuals used in the ES. This would apply to small soil delineations and range sites.

27-2 See Response 21-8.

27-3 A new heading has been given to column A of Table 2-8 and its related key.

27-4 The column 1 heading of Figure A-4, p. A-13, has been corrected. The terms range type and vegetational type are synonymous as used in the ES. Vegetational type numbers correspond to numbers assigned to various vegetative types in BLM Manual 4412 (Ocular Reconnaissance Survey Method).

27-5 All range types (from Ocular Reconnaissance Survey) that fell into one range site by pasture were averaged. Range condition was determined by range site by pasture.

Also see Response 27-4.

27-6 Figure A-7 is a comparison of the range site guide and range type writeups to arrive at a range condition rating by range site by pasture.

27-7 See Response 21-5.

27-8 The SCS does not have the SD-1 MLRA finalized. Until the MLRAs are finalized, we will not change our calculations. It appears that four or five allotments may be effected (See updated MLRA on p. 2-6).

27-9 The PUF values were developed from BLM data, Interagency Range Survey Committee, Interagency Committee on Big Game Range Analysis, literature and assistance from C. H. Herbel, A.R.S., Jornada Experimental Range; Reldon Beck, Professor of Range at NMSU; Jim Powell, SCS Range Conservationist, Las Cruces; and various BLM personnel. The PUF values were developed in March 1977. PUF values for all species are in the Socorro District Files.

27-10 See change in wording on p. 2-2. This statement was qualified on p. 2-77. Actual use is known on the six FAR allotments.

27-11 A definition of density was added to the Glossary.

27-12 Pace-point is described as method of training for estimation in Ocular Reconnaissance Survey. Complete methodology for pace-point transecting is described in BLM Manual 7322.

27-13 Nothing in the literature could be determined so this relationship was based on field observation and judgments made by personnel in the District Office.

27-14 The change in range condition is due to improvement in vegetative composition and the change from less desirable species to those which are more desirable (See Chapter 2, Vegetation, Range Condition Impacts, Introduction, p. 2-35 and Appendix 2, p. A-44). Changes in composition leading to increased vegetative AUMs is explained in Chapter 2, Vegetation, Vegetative Composition, p. 2-30.

27-15 Stable trend would mean that current stocking rate is not causing further degradation of the range but also means the range will not improve under the present grazing management.

Each of the three items listed under range trend on p. A-44 was evaluated to determine that range trend data was inadequate for the entire ES Area.

27-16 Portions of Tables A-12, A-13, A-15 and A-17 have been revised along with discussion in the methodology. This should clarify this section.

27-17 The value 0.5 comes from Table A-16 on p. A-57. The value 0.74 is based on Tables A-10 and A-11 on p. A-50 and is explained under Methods on p. A-49.

27-18 The WEGs reflect the soil's susceptibility to wind erosion in a non-vegetated condition. Because no attempt was made to quantify the actual loss, there was no need to adjust the process for rangeland conditions.

27-19 Table A-21 was developed from the BLM PSIAC nomograph paper which was prepared by BLM's Denver Service Center. The straight PSIAC Method was used with BLM's phase I factors. This was field tested to ensure reliability.

Table A-21 was used to convert PSIAC ratings to sediment yield values.

27-20 This is only one of the criteria used and is just a minimum. This figure is commonly used in watershed calculations and allows impacts to be traced.

27-21 This is a widely used method in watershed calculations. While it is true this method was developed for cropland, it can be used to indicate a response from different actions on rangeland.

27-22 For purposes of the impact analysis it was not necessary to list how each grazing system was selected for each allotment. The literature survey indicated there would not be any difference in vegetative response from the proposed grazing systems except for certain species as described on p. 1-5.

27-23 See Response 21-1.

27-24 Before decisions are issued, the forage consumptive rates for antelope that are suggested in Information Memorandum No. DSC-79-66 will be used to determine the deduction of AUMs for antelope.

27-25 Literature indicates that antelope, in most circumstances, negotiate fences by going under or through (See text change p. 2-105).

27-26 The range survey determined the AUMs available on both suitable and unsuitable range. The wildlife AUMs were subtracted proportionally from AUMs on both suitable and unsuitable range. The forage competition does not overlap 100 percent. However, the percent of diet overlap of big game and cattle is unknown on the ES Area. Without the diet overlap data, forage is allocated to wildlife on the assumption of 100 percent overlap according to DSC Information Memo 79-66.

27-27 In Chapter 2 the Assumptions and Analysis Guidelines (p. 2-2) is a summation of basic data and general assumptions which are necessary to guide impact analysis for the writer and the reader.

The amount of reduction on AMPs and on public land is shown on p. 1-1 and on p. A-7. On the AMP areas, private and State lands are also adjusted according to the range survey data. This information is available for public inspection at the Socorro District Office.

27-28 These allotments have resource problems (i.e., poor and fair range condition) that have been identified. The justification for the additional range developments is on file in the Socorro District Office. The B/C analysis is not the sole determining factor for an allotment to be included for proposed developments.

27-29 An input-output model was developed and adopted to the ES Area by Dr. Robert Lansford of Southwest Research and Development Company. The model produced a multiplier of 3.1738 for the range livestock sector. The range livestock income was multiplied by 3.1738 to arrive at the indirect income for the Proposed Action and its alternatives.

27-30 When a comparison was made between Table A-26 showing ranch income and Table 2-22 showing non-ranch income, it was determined that the subsistence ranches are 23 percent dependent on ranch income. Small, medium, and large ranches were 66, 84, and 87 percent dependent on ranch income, respectively. Smaller ranches are less dependent on ranch income; while the larger the ranch, the more dependent they are on ranch income.

27-31 The adjustments made on the ranch budget were coordinated with Dr. James Gray from Southwest Research and Development Company (SRD). It was felt that by extrapolations and extrapolating, the efficiency of operation of the size category would not be changed. The ranch budgets produced by SRD are also their best estimates.

27-32 Page 1-1 shows a comparison of the range survey results to present licensed grazing use. Since actual use is not known on most allotments existing licensed use was used.

27-33 The proposal concerns only public lands. See p. 1-11 which explains private and State lands and their relationship to the proposal. The overall magnitude of adjustments in livestock use is 30 percent.

27-34 The figures on p. 1-1 that refer to public land do not include State, private or Bureau of Reclamation.

27-35 See Visual A in packet in back of the document.

27-36 The needs of each resource would be determined by the Bureau's planning system with input through the public involvement process.

27-37 Efforts are being made to establish an effective working relationship with the State Land Office.

27-38 The objectives of the Proposed Action and alternatives could be met through grazing management alone.

27-39 The 70 percent utilization refers to the key species (See change in text).

27-40 The range survey indicated that the acres/AUM on these three allotments vary from 220 to approximately 350.

27-41 Text has been changed to reflect the comment (See p. 1-11).

27-42 See definition of intermingled land which has been included in the Glossary, p. G-4.

27-43 See Response 21-2.

27-44 The No Action Alternative in the ES was defined before the planning regulations were proposed.

27-45 See Response 12-3.

27-46 The forage acre requirements (FARs) previously developed in the old Southern Desertic (SD) should be adequate for SD-1 and SD-2.

27-47 The range survey was conducted according to BLM Manual 4412.11A. Barren and waste are used correctly according to the definition in the manual.

27-48 This is a function of data analysis.

27-49 See definition of cover and density in Glossary on p. G-2. The percentage of change predicted for density is small, and cover may give a better index to change.

27-50 The BLM has no assurance that the operators on non-AMP allotments will undertake a management program similar to what BLM has proposed in the ES. We have to assume no change for these allotments in the ES Area although there may be a change in range condition within individual allotments.

27-51 Correction has been made (See p. 2-29).

27-52 This is an average response for the ES Area from what the AMP writers predicted in each AMP. This would not necessarily be the same response for each individual allotment.

27-53 The Proposed Action indicates that BLM would be setting numbers and season of use in AMP areas. Under the No Grazing Alternative BLM would only eliminate livestock grazing on public land, hence no predictable change from the present on private land on those allotments that have the major riparian areas.

27-54 The first sentence of Soils, Existing Environment, Water Erosion section only attempts to highlight some of the material presented in Table 2-8 and relate it to the discussion on water erosion. This does not mean that other factors are not important. The factors which were used to estimate erosion are those mentioned in the PSIAC Methodology part of Appendix 3.

27-55 See Response 12-3.

27-56 The opportunity for operators to enter the industry exists as the range improves. This does not, however, necessarily mean that the same individual who had previously gone out of the industry will be the one re-entering.

27-57 Visual C was developed from soil maps. Every soil which could be placed in a range site was colored in on the map by range site. Most of the range sites have several soils in them. The soils in each range site appear on Table 2-8. The title of Visual C has been changed for clarification (See Map Errata sheet, p. xiii).

27-58 Figure A-17 is a scenery quality inventory chart and has no relationship to vegetative types. The vegetative types are presented beginning on p. 2-5 through p. 2-17. All vegetative types except barren are indicated on Visual B. Barren was not shown on Visual B because of the scale of the map. The areas classified as barren are generally very small in size.

New Mexico Cattle Growers' Association
2231 RIO GRANDE BLVD., N.W. • BOX 7517
TELEPHONE (505) 247-0584
ALBUQUERQUE, NEW MEXICO 87194

May 7, 1979

28

Mr. Arlen P. Kennedy
District Manager
Socorro District Office
Bureau of Land Management
P. O. Box 1217
Socorro, New Mexico 87801

Dear Mr. Kennedy:

Enclosed are the comments, as well as questions, on the Draft E. S. for the East Socorro District.

Before starting my comments of the East Socorro E. I. S., I would like to formally request that more time be given for comments. This extension of time is needed because, as you realize, this is a rather lengthy document containing a large amount of data which cannot be analyzed by people who have not had some training in this field. In order to give adequate time for the permittees to get someone with the expertise required to analyze the E. I. S., at least one year is needed. After all, it took the Bureau of Land Management two years to gather and analyze the data, with many people working -- surely one year is not too much time to allow the permittees.

If no extension is allowed, I would like to have a response to the enclosed questions within 45 days.

Sincerely,

Bill Warbois

Bill Warbois
Executive Secretary

BW:ebs

Enclosure

On page 1-10, you state that on non-AMP allotments, BLM would conduct studies on public lands to monitor range condition and trend. If range condition and/or trend is declining, action would be taken to reduce grazing preference: Why was this not considered for more allotments? There were many allotments which at least a large portion of the allotment is in good condition and you state that 80% of the area is in stable or improving condition. I will discuss an alternative proposal, which is based on this idea later in my comments.

On page 1-10 and 1-11, under your discussion of interrelationships, grazing seems to be considered differently. If this is true, how and why is this?

Page 1-11, you have mentioned the wilderness studies which are being conducted. I realize that most of this document was finalized before completion of your present potential wilderness area identification; however since many of these areas have been identified, if they do become wilderness, how will this affect the proposed AMP's in those areas?

Page 1-11, under the discussion of Private and State Lands, a reference is made to Section 402(f) of F.L.P.M.A., -- This section allows the BLM to refer to livestock operations or range improvements on non-federal intermingled lands, it does not mandate this nor does it authorize it without meeting the requirements for implementing an AMP under the other sections of F.L.P.M.A. as amended by the 1978 Range Lands Improvement Act, which states: He (the Secretary) shall do so in careful and considered consultation, cooperation and coordination with the lessees, permittees, and landowners involved, the district grazing advisory boards established pursuant to section 403 of the Federal Land Policy and Management Act (43 U.S.C. 1753), and any State or States having lands within the area to be covered by such allotment management plan.

Has this criteria been met? Should it not have been done before the document was completed so as to facilitate its implementation?

Page 1-22, under the No Grazing Alternative, part 2, the statement is made that 1,475 miles of fence on the boundaries of private and state land would have to be built by the ranchers to exclude livestock from public land. How can you establish that the ranchers would have to build the fences, not the BLM, when this area would come under the Herd Laws of New Mexico, which requires you to fence livestock out, not in?

I would also like to propose two other alternatives, and ask why they should not be considered:

1. A stewardship program where the BLM would develop with the other affected landowners a realistic plan of what improvements in range conditions could be expected as well as what other things the land should have, such as wildlife habitat, historic resource protection, etc., then allow the rancher to manage his allotment as he sees fit with the BLM monitoring the range. Only when there is a deterioration of range condition, in the case of good condition or the realistic amount of improvement is not made according to the plan agreed upon, would it be necessary for the BLM to develop an intensive management plan? This would reward the good managers and only penalize the bad managers, as well as require less time and expense to the BLM. In the 1978 Rangelands Improvement Act, this type of plan is refered to.

2. The other alternative which was not discussed, was for the BLM to fence their lands and manage them as they see fit, leaving the other landowners to manage their lands as they see fit. In many cases, this may not be feasible; however, this is what the BLM is telling ranchers who do not want to include their private land in an AMP, so it would only be fair to consider the same for the BLM if they do not want their lands managed under the permittees' system.

4-50

Page 2-1, Under the Impacts - Assumptions and Analysis Guidelines section, you make the conclusion that vegetative responses cannot be differentiated among the various grazing system. Why then was each permittee

28-1 not contacted to find out which system would work best for his operation, so he could have some input as to what type of system he would have?

Page 2-1, You also mention Key and Comparison Areas within the E.S. Considering the diversity of ranges within the ES area, I have several questions about these Key and Comparison Areas:

1. How many areas were there and how large an area were they?

2. Was a comparison area established in each range type?

3. Was a history of climatic conditions kept for each area to establish if an area had less than average or more than average rainfall, temperature, and what time of year the moisture came so as to give equal credit to areas compared to them?

Page 2-2, The statement is made that "informal conversations with allottees indicate that some are operating at levels lower than existing

28-2 use." This brings many questions to mind and unless this can be substantiated, should not be included in the statement, as the ES should contain fact, not hearsay or assumptions.

1. The statement infers that all permittees are doing this. Is this true? If not, how many are and are not?

2. Has any attempt been made by the BLM to establish this?

3. Those who are operating at less than existing permit numbers, are they doing this temporarily due to the drouth of the past few years, or have they been doing this for a long period of time? (10, 20, 30 years?)

4. Has there been a history of nonuse permits in the area. After all, a rancher would not want to pay for animals they don't have on the range, would they?

Page 2-15, Under Creosote Type, where creosote is in a gravelly range, is it considered an invader? If so, when was it first seen in the area?

Page 2-17, Under Sage Brush Type, you state that the York and Dick Peddlies (1969) report suggests that range condition has dropped below the excellent and good condition classes. When did this change occur, if it occured, and could there have been more than 5% of these species in an area before man used the area?

Page 2-17, Under Yucca Subtype, would yucca be considered an invader, increaser, decreaser, desirable or undesirable range plant?

Page 2-20, Under Range Condition, how is the composition of a climax community established, and who makes the decision?

Page 2-22, A phenological development chart is included. Does the time of development depend on calendar dates or would they vary depending on temperature and moisture?

Range Condition Map, following page 2-25: Could the time of year and climatic conditions affect the outcome of surveys done to develop this map due to growth patterns of plants such as annuals?

Tabe 2-6, Page 2-27: Are not the figures under the proposed action only estimates which could be off greatly due to variations in climatic conditions and other variables?

The way the statement is written, and this chart is made, the reader is led to believe that these are fact when in reality are they not just guesses based on studies done in other areas which may have had somewhat different conditions?

Page 2-28, You say that trends should be analyzed on an allotment by allotment basis and with at least two readings, preferably 5 to 10

28-3 years apart. Was this done to establish the trends for this document? Were markers placed where you could go back and run the transects in the same place so a comparison could be made in 5 or 10 years?

Throughout the discussions of the Impacts of the Proposed Action, you state increases in vegetation and other impacts as fact. Does this mean that you can guarantee these things to happen? If not, then you should change the wording throughout to express the fact that these are only predictions based on some studies. What percent of differences in changes of range condition is shown in all the studies you reviewed?

Page 2-28, When establishing a climax community for comparision to existing vegetation, what criteria is used and who has established them?

28-4 Page 2-28, Under Density and Cover, you discuss your predictions of the long term impact; what will be the short term impact?

Page 2-29, You discuss the study by Paulson, which supports your work and barely mention Hazel's work, why?

28-5 You repeatedly say existing use is heavy (60% to 70%); how was this figure arrived at? Was an actual use study done?

Page 2-29, Under the No Action Alternative, here as well as elsewhere, you state that no increase will occur. Does this mean that no work has been done in the past to improve the condition of the range? Are there no changes occuring now? Does this mean if the AMP system is not implemented, the BLM will make no other efforts to improve the range? I include only the BLM in the last question, because most ranchers will continue to improve their operations as they have in the past, as is shown by the number of range improvements built by the ranchers.

28-6 Page 2-30, You state in two places on this page, as well as elsewhere, in the statement that on non-AMP allotments, because public lands are intermingled with other lands, total livestock numbers are not set by BLM. Do you not set numbers on allotments now, with or without AMP's? If a rancher has more cattle than they have been alloted, would he not be liable for trespass? If the answers to these questions are yes, then this statement must be removed wherever it is used.

Page 2-30, You state that vegetation composition is not expected to improve on non-AMP allotments, because the public lands are unfenced and intermingled with other lands and livestock numbers are not controlled by BLM. Under what law or regulation are you given the authority to not regulate livestock numbers on BLM lands? The same questions and statement would hold ture here, as previous question about page 2-30.

28-7 Also, on Page 2-30, you state, "The predicted improvement is realistic because it is similar to the improvement reported in published research from many parts of the Western ranges'." Could you not also be correct by saying the predicted improvement is not realistic because of the number of studies showing decreases in range condition?

28-8 Page 2-33, Third paragraph, first column, how can you state these as fact, when you have quoted some studies showing adverse effects? You again make an untrue statement saying you have no authority to control livestock numbers on BLM lands except under AMP's.

Page 2-34, First paragraph, again you are leaving the reader with the idea that nothing will be done to improve the range unless an AMP is implemented when in fact, has not work been done by both the BLM and the ranchers in the past? There is no reason to assume that at least the rancher will continue his efforts. Must the reader assume that the BLM does not intend to unless an AMP is written? These questions also would apply to discussion of No Action Alternatives, on page 2-35, and elsewhere in the statement.

28-9 Page 2-37, Second to the last paragraph, the erosion data are only estimates -- why was no effort made to check validity by making actual measurements?

28-10 The map of Sediment Yield Classes -- Was this map developed by collecting sediment data from the area and on the ground studies, or was it developed by estimates resulting from potential yields based on the soil type? If the latter is the case, this should be made clear so as

not to mislead the reader. Does the map also mean that all areas within a certain class on the map will have that amount of sediment yield? This also should be made clear.

28-11 Page 2-56, First paragraph, are these statements always true, or are they generalities which may vary depending on site specific conditions? This should be made clear to the reader.

28-12 Page 2-59, Under the No Action Alternative, you state that, "Range site soil groups would have a large percentage of their area on the 25 existing AMP allotments, which have lower sediment yields that those on non-AMP allotments." Does this mean the BLM will not do or allow any erosion control work on non-AMP allotments? If so, why? This should be discussed in the statement.

4-52

28-13 Page 2-63, Third paragraph, under Surface Water Resources, you state, "The Rio Puerco ... picking up inordinately large amounts of sediment," the word inordinate should be taken out since the word means, it exceeds reasonable limits, and there are no facts to substantiate this; or facts to substantiate it should be included. How much of the sediment load is natural, and how much is man-made?

28-14 Page 2-70, Ground Water Resources - Where are the ground water developments and who constructed them? This information should be included so as to give the reader a good perspective of the existing situation.

28-15 Page 2-76, You give figures as to the amount of forage increase there would be under each alternative and the resulting change in the amount of runoff. How were these figures arrived at?

Page 2-77, Introduction - What are these figures based on? Total number of cattle, numbers of calves born, pounds of beef produced? The type of figures used would have a drastic effect on the implications of these figures. Since this is primarily a cow/calf area, to have a true picture of the relationship you would have to compare the number of calves sold in the area to the total number of calves sold nationwide.

Page 2-77, Throughout the statement you say that the only way proper management can be achieved is through AMP's. Why then are 17 of the existing AMP's receiving cuts in numbers when some of these have been in existance for over 10 years? What guarantee can you give that the experience of the past will not hold true in the future?

28-16 Page 2-77, You can refer to Informal Conversations with some allottees indicating they graze less than they are presently licensed for. How many is some - 2 or 50? Is this every year or only during drouth years? Do requests for nonuse substantiate this? If this cannot be backed up by fact, it is just hearsay and should not be included in this document.

28-17 Page 2-77, Under Future Environment - you state that there would be no new community allotments - yet the tables and later references state that there would be the same number of operators and fewer allotments. How can this be?

28-18 The Table #2-19, shows no decrease in number of operators for short or long term - yet on page 2-94, you state there would be a decrease. How can this be? Also, on page 2-91, you say some ranchers would have to drop out of the ranching industry.

28-19 You also state that the effect on small ranchers would be less than on large ranchers because the small rancher has income from other sources. But, if a small rancher's only source of income is the ranch, the effect would be devastating! How many of the small ranchers have supplemental incomes? How many have only the income from their ranches?

This part of the statement cannot be adequate until these questions are answered and included.

28-20 Are the predictions for increases in AUM's accurate enough to be guaranteed, or are they only assumptions? If they are not accurate enought to be guaranteed, the Socio Economic Section should discuss the long term effects, if no increase happens. None of the existing AMP's are receiving this large an increase.

28-21 Page 2-95, What would the effect of the decline in short term income be on the local communities?

28-22 Page 2-98 - Deer--you discuss what the deer population is and then make the assumption that the population should be larger. What is the basis for this assumption?

Antelope - the same question applies to antelope.

28-23 Page 2-105 - You state that deferred pastures would provide forage and cover to big game, yet, on the Ft. Stanton Research Ranch, it has been shown that the deer tend to stay in the pasture with the cattle rather than in pastures without cattle. Why is this not considered?

28-24 Also, there is very little competition between cattle and deer or antelope, except for 1 or 2 species of plants which only occur in a few areas. You have insinuated there is always competition between them, why?

28-25 Page 2-125 - O.R.V. - Use is increasing dramatically, and many ranchers have spoken with local BLM officials about this. Why was this not mentioned?

Page 2-145 - If the 31 wilderness inventory units are put into wilderness, what effect would this have on the long term effects projected in this statement?

28-26 Chapter 4 - Many of the ranchers were not contacted, nor was the State Land office contacted, prior to the writing of this document. Does this mean that you did not feel this was important to fully achieve full consultation and coordination? What about the 1978 Public Rangelands Improvement Act requiring consultation and coordination?

Thank you,

Bill Warbois, Executive Secretary
New Mexico Cattle Growers' Association
P.O. Box 7517
Albuquerque, New Mexico - 87194

28-1 See Response 25-1.

28-2 See Response 12-3.

28-3 Trend studies are inadequate in the ES Area. For the purpose of this analysis range trend is assumed to be stable (Refer to p. 2-2, left column, first paragraph; p. 2-28, left column, first paragraph; and Appendix 2, p. A-44).

28-4 Due to the short period of time (5 years or less) and the livestock reductions being spread over 3 years in some cases, it is anticipated there would be no measurable change in cover and density in the ES Area in the short term.

28-5 The proper use factor (PUF) for the Proposed Action averages 50 percent. Since the range survey indicates a 30-percent overusage in the Existing Environment, this would indicate heavy (60-80 percent) use on the average when the ES Area is considered.

28-6 In Chapter 2, the Vegetation Section Impacts (Density and Cover), the non-AMP allotments referred to are those allotments shown on pages A-6 and A-7 that were not proposed for inclusion into an AMP under the Proposed Action. These are small isolated tracts of public lands intermingled with large tracts of private and State lands. We will issue a permit for the AUMs on public lands; however, these tracts normally do not receive the close supervision given AMP allotments.

28-7 The literature showed a variety of results as on pages 2-30 through 2-32. The predominant pattern was one of improvement and was the one followed.

28-8 BLM does have the authority to set livestock numbers on any public land and will do so. The test has been clarified (See pp. 2-29, 2-30, and 2-33).

28-9 The PSIAC Method, as used by BLM, has been field tested elsewhere. This method is one that is best suited to natural rangeland conditions at the present time. It would not be feasible to make actual measurements for all the soils on the 838,808 acres of public land in the ES Area because of length of time required for such an effort.

28-10 Paragraph 9 of the Soils-Section, Existing Environment, Water Erosion states "Sediment yield classes presented in Table 2-9 and Map 2-4 are based on the Pacific Southwestern Inter-Agency Committee's (PSIAC) Method (1968) for estimating erosion."

Map 2-4 is a display of the relative range of sediment yield values in the ES Area based on the sediment yield classes which the majority of the soils in a particular range site fell. The weighted average of sediment yields for all the soils in a sediment yield class from Table 2-9 were used to develop Map 2-4.

28-11 The last paragraph of Soils section, Existing Environment, Water Erosion, has general statements. These statements are true for the soils in a range site soil group in general (See values from Table 2-9); however, these vary depending on local conditions.

28-12 This sentence has been clarified (See text p. 2-59).

28-13 The next sentence refers to the Army Corps of Engineers' report of 1972 which will support the statement in the text.

28-14 The groundwater resources refer to aquifers found in the ES Area and not man-made water developments. Visual D, in the back of the book, shows Existing and Proposed Range Developments. Each grazing file in the District Office indicates who was responsible for constructing the various developments.

28-15 The values for increasing forage and the change in amount of runoff are from the methodology in Appendix 4, pp. A-78 through A-82, which are based on a literature review. This methodology was used to make predictions for vegetative change. Vegetative changes were then used to calculate changes in runoff.

28-16 See Response 12-3.

28-17 Table 2-19, p. 2-78, is in concert with what is written in the text. The subtotal and grand total lines under NA/FE indicate no change in the number of operators or allotments in the short and long term. This also agrees with the EE column.

28-18 Table 2-19 subtotal line shows the change in the number of operators for the short and long term for the Proposed Action and various alternatives. This agrees with the statement on p. 2-94.

28-19 The text discusses the small and large operators as a group and not on an individual operator basis. Depending on the amount of livestock adjustments, the reduction in income would be devastating to some operators. Fifty of the small operators (1-199 AUs) have other sources of income. Six of the small operators (1-199 AUs) have income only from their ranches.

28-20 The predictions for an increase in AUMs are based on site potential data from the SCS range site guides which were adjusted to local conditions. As indicated from the literature review, these figures are realistic for the western ranges.

28-21 The existing output for East Socorro ES Area economy is $29.8 million. The range livestock contribution is $2.5 million or 8.3 percent. With implementation of the Proposed Action the range livestock contribution would be $1.2 million or 6.3 percent, a decline of 24 percent from the existing environment in the short term.

28-22 We did not state that the deer number should be larger. Numbers have declined as stated on page 2-98 by the NM Department of Game and Fish. We have stated that antelope population is stable to increasing.

28-23 Dr. V. W. Howard, NMSU, (via personal communication) indicated that there is no research on Ft. Stanton Research Ranch that indicates that livestock have influenced deer movement. Dusek 1975, indicates that deer tend to avoid cattle concentrations. Increased forage and cover would be available to big game in the deferred pastures.

28-24 See Response 27-26.

28-25 Concentrated ORV use causing resource damage has not been identified as a significant problem on public land within the ES Area. ORV use is addressed in the ES beginning on p. 2-125 and again on p. 2-132.

28-26 The State Land Office was contacted several times during ES preparation. They were sent the June 27, 1977 letter described in Chapter 4. On March 27, 1978 the BLM State Director wrote the State Land Commissioner to lay out a strategy to resolve problems of mutual concern to the two agencies. The ES team leader met with the State Land Commission later in 1978 to discuss the ES.

(For rest of answer see Response 25-1).

5/7/79-Telecopy

STATE OF NEW MEXICO

29

Department of Agriculture

GOVERNOR'S CABINET

Box 3189, NMSU Campus
Las Cruces, New Mexico 88003
Phone: (505) 646-3007

BRUCE KING
Governor

WILLIAM P. STEPHENS
Secretary

May 4, 1979

District Office
Bureau of Land Management
P.O. Box 1217
Socorro, New Mexico 87801

Dear Sir:

This letter is intended to serve as written comments on the Draft East Socorro Grazing Environmental Statement.

The proposed actions under the Environmental Statements (ES) should not be implemented at this time, because it was developed with insufficient data upon which to base a proper management program. Although the Bureau of Land Management (BLM) is under court order to develop ES, they apparently are not required to develop specific action programs until adequate information is available.

I am certainly not opposed to proper range management practices being applied to BLM lands. The vegetative data collected over the course of two years, following several dry years, is woefully inadequate to justify implementing such far-reaching proposals. The New Mexico State University's Range Improvement Task Force has presented detailed comments on the methodology involved to accumulate the range inventory data and to determine the carrying capacity which resulted in adjustments in the stocking rate. I basically concur with their comments and I am strongly opposed to the proposed actions. These actions will result in an overall average livestock reduction of 30 percent.

The subject pertaining to "intermingled" Federal, State and private land has not been adequately addressed. The same basic problems apply to this situation that are under legal proceedings relative to the Rio Puerco Grazing Environmental Statement. Until the legal problems are resolved, further actions by BLM that impact on State or private lands should not be implemented.

29-1 The proposed actions essentially provide for "range improvement" through adjustments in livestock numbers and by manipulation of grazing pressures with various grazing systems. Revegetation and/or brush management is not proposed. These practices have been used successfully in this area, and if implemented could reduce the percentage livestock reduction.

29-2 The distribution and abundance of rabbits and rodents--prairie dogs, kangaroo rats, and gophers--have not been mentioned. These animals eat, and they impact to some degree on rangeland conditions and the ability of the rangeland to "improve." While 4,802 AUM's have been allocated to "Wildlife" (includes only mule deer and pronghorn antelope) and 384 AUM's to wild horses, there has been no forage allocation for rabbits and rodents. If for example, based on information and proper data on such aspects as rodent distribution, abundance, and food habits, the rodent population is determined to be impacting the rangelands, a rodent control program should be included in the proposed actions. These typea of data are not presented, and a control program is not addressed. Again, this is another management practice that could result in lower livestock reductions.

29-3 The economic impacts of the proposed actions have scarcely been discussed. To the comments of the NMSU Range Improvement Task Force I would add: What will be the economic impact on the communities specifically affected by this Grazing Environmental Statement (ES) such as Socorro, San Antonio, Magdalena, Belen and Mountainair? The loss of revenue caused by an average 30 percent reduction in livestock adjustments could directly and indirectly affect these communities. For example, could the local feed and tack store survive? A reduction of this magnitude in their business could mean the difference in success or failure. How will this type of reduction to the livelihood of taxpaying ranchers and these other businesses affect the tax base of these communities? If you add to this ES the effects of all the planned ES's for the State, the impact could be serious to the economy of New Mexico.

Obviously there are many unanswered questions and unknown ramifications pertaining to the impacts that could result from the implementation of the proposed actions. Since the BLM is not legally mandated to implement such actions, I request that the proposed actions be postponed until adequate information is available to prepare and implement a sound management program on land administered by BLM.

Thank you for your consideration.

Sincerely,

W.P. Stephens
William P. Stephens

WPS/bb

29-1 See Response 27-38.

29-2 AUMs were not allocated for rabbits and rodents because their numbers are unknown. Their numbers would be very difficult to determine for the present and future. Average utilization of key species is 50 percent for cattle, big game and wild horses. The remainder has been left for soil and watershed protection and other species of wildlife. We realize that rabbits and rodents do consume vegetation. Problems have not been identified in the ES Area warranting allocating additional forage or control of rabbits and rodents.

29-3 See Response 28-21.

Socorro Livestock Market, Inc.

MARKET DAYS MONDAY 10:00 A.M.

P.O. Box 1736
Socorro, New Mexico
87801

(505) 835-2219

May 7, 1979

30

Department of Interior
Bureau of Land Management
P. O. Box 1217
Socorro, New Mex. 87801

Dear Sirs:

We are writing to protest the proposed decisions of the Bureau of Land Management concerning the East Socorro Grazing Environmental Statement.

30-1 According to information that we have received, this would greatly effect the economy of our area. We feel that more consideration should be shown pertaining to the large investment of dollars and years of hard work that those most affected will feel. We further feel that a closer look at the detriment to the area's economy should be more closely considered. A few things that we know this action will affect will be:

1. Taxes for schools
2. State and Federal taxes
3. Jobs for more people will be cut, new job opportunities will not be available
4. Our local dealers and business people will definitely be effected when ranchers can't spend as much because of less income
5. Our personal business with 4289 cattle removed from the area will be greatly impaired.
6. On today's market this amount of cattle and their home

Socorro Livestock Market, Inc

pg. 2

would be valued at approximately eight and one half million dollars, plus on today's market this amount of cattle would produce about one and one half million dollars worth of beef annually.

We feel that since according to government surveys we show a shortage of beef, what are we doing cutting our numbers even more? It appears to us that much more thought should be taken prior to any action.

We further feel that if the decisions are not reversed , then these ranchers who are affected should be paid for their loss. Our estimate is approximately $2,000 per cow unit from their permits. And we further feel that the government should pay this.

How can we expect to fight inflation and hold down the high cost of everything by severly damaging such a small area as we have. Should'nt our government agencies be the first to exemplify their inflation fighting intentions?

Sincerely,

Arkle Kleine
Socorro Livestock Market

30-1 See Response 28-21.

NEW MEXICO FARM and LIVESTOCK BUREAU

TELEPHONE (505) 526-5521

421 NORTH WATER STREET
LAS CRUCES, NEW MEXICO 88001

May 7, 1979

31

District Manager
Bureau of Land Management
Socorro, New Mexico 87801

Dear Sir:

The New Mexico Farm and Livestock Bureau appreciates the opportunity to express our views concerning the East Socorro Draft Grazing Environmental Statement.

Farm Bureau is the largest general farm and ranch organization in the state of New Mexico with over 11,300 family members. A high percentage of the farmers and ranchers in New Mexico belong to our organization.

Proposed reductions in public grazing will significantly reduce beef production in Future years, creating an even greater shortage of beef cattle and a burden on the consuming public. We feel the overall proposed cuts are neither realistic nor necessary. The result will be a reduction in beef production at a time when government officials are asking for increased production to stabalize prices.

The economic adversity of the BLM's proposed cuts is staggering both to the rancher himself and surrounding community. Based upon the carrying capacity of the Socorro District and BLM's proposed average cut, the area will lose gross sales annually in excess of one million dollars. (Figures based upon overall carrying capacity of district and cattle averaging $400.00 per head.)

31-1 The immediate financial burden is upon the rancher himself. If the average reduction is 30%, the rancher stands to lose substantially in terms of the value of his cow units. At today's cow unit valuation, where will the rancher make up the loss (no compensation for the loss is mentioned anywhere)?

31-2 The cow unit reduction dollar loss does not even consider the potential dollar loss from the cow and calf crop. With the proposed reduction and any possible future reductions, how is a rancher to make any future financial planning? The lending institutions may find making loans to permitees on long term basis a little uncertain.

The affect of the proposed cuts is to eliminate some cattlemen immediately and force others out of business over a period of a few short years. Proposed grazing reductions will negate a number of economically viable units. Many of the units in the East Socorro area are small, and any cut, regardless of amount, will mean economic ruination.

Certainly, ranchers who make their livelihood from rangelands believe strongly in proper management techniques. A vast majority of them are presently practicing good range management. However, it is somewhat preplexing to know that for many ranchers participating in the AMP's they find themselves faced with substantial reductions. This leaves many ranchers doubtful of any future BLM management plans.

We feel that most of the ordered reductions are unnecessary for range improvement. To drive the cattlemen from the rangelands, for which they have custodial responsibilities, cannot be in the best interest of range improvements and is not in the best interest of the public. There are too many contradictions and questions as to the validity of the range survey methods under which the East Socorro plan was conducted for the BLM to say this is what we propose in the future.

In view of the many doubts arising (range survey methods, AMP cuts, compensation for reduction, intermingling of private, state, and federal lands) we urge a re-evaluation of the draft statement, with an opportunity for ranchers, in cooperation with the Bureau of Land Management, to help develop a long range program. Such a program could assure no degradation of the rangelands through regular monitoring, could assure continued improvement of rangelands, and would avoid economic disaster for many of the present permitees.

Sincerely,

Walt Greeman

Walt Greeman
Chairman, Public Lands Committee
New Mexico Farm and Livestock Bureau

31-1 The BLM is not authorized to make any compensation as a result of livestock adjustments. BLM is exploring means of economic mitigation with governmental and non-governmental programs that offer financial assistance. Other means of mitigation include scheduling reductions over three years and providing an option of adjusting periods of use and/or numbers.

31-2 The ranch budgets provided to us by Southwest Research and Development Co. did not address the potential dollar loss from cow and calf crop. Neither is the BLM supposed to provide guidance for future financial planning by operators.

32

Socorro County Farm and
Livestock Bureau
%Dan B. Kloss
Box 29
Lemitar, New Mex. 87823
May 5, 1979

Department of Interior
Bureau of Land Management
P. O. Box 1217
Socorro, New Mex. 87801

Dear Sirs:

I appreciate the opportunity to comment on the East Socorro Grazing Environmental Statement. However, I feel that the time allowed for puplic input is entirely too short.

After reviewing the study and proposed plan of action and noting the negative economic impact to the community as a whole and especially the diesasterous effect on the individual rancher we, in the Socorro County Farm & Livestock Bureau, sincerely request any decision to implement this proposal not be made until a more thorough study can be made. An extension in time should be allowed in order that the Bureau of Land Management might receive the type of public input that will help in revising the final draft into a more adequate statement.

32-1 I feel it should not go unnoted that to base a plan of land improvement on one time spot observations carried out by inexperienced personnel lacking understanding of the varialbe conditions prevalent in the semi-arid southwest is a misrepresentation of the true situation.

Sincerely,
Dan B Kloss
Dan B. Kloss
President

DBK/wrk

32-1 See Response 12-1.

33

VAN LANDINGHAM CONSTRUCTION CO.
914 SUNSET NW · SOCORRO, NEW MEXICO 87801 · PHONE 835-0127

May 4, 1979

Department of Interior
Bureau of Land Management
P.O. Box 1217
Socorro, N.M. 87801

Gentlemen:

It would seem to me, that people of your intelligence would be able to foresee what a terrible condition you are forcing on more than just the ranchers with your East Socorro EIS. This E I S is going to force the small rancher out of business in most instances. The larger ranchers might survive this ridiculous plan you are proposing. In my opnion however, if the rancher does survive this EIS, he will be forced to demand higher prices for his cattle— This price increase will automatically be passed on to the poor housewife trying to meet her budget & keep some sort of meat on the table for her family.

I was born in Socorro, & have watched my grandparents & parents make ranching a business that anyone could be proud of. By this I mean that no grazing land was overgrazed because they were intelligent enough to realize not to overcrowd the land during years when there was little rainfall. They managed to do this without unqualified government officials telling them how.

I feel that your EIS is one of the most detrimental plans I have ever seen proposed. Perhaps you should put some more thought into this before it is too late for everybody!

Thank you
Larry Van Landingham
Larry Van Landingham Gen. Contractor

34

STATE OF NEW MEXICO

DEPARTMENT OF FINANCE AND ADMINISTRATION PLANNING DIVISION

BRUCE KING
GOVERNOR

DAVID W. KING
SECRETARY

ANITA HISENBERG
DIRECTOR

505 DON GASPAR AVENUE
SANTA FE, NEW MEXICO 87503
(505) 827-2073
(505) 827-5191

May 7, 1979

Mr. Arlen P. Kennedy
District Manager
Socorro District Office
Bureau of Land Management
Post Office Box 1217
Socorro, New Mexico 87801

Dear Mr. Kennedy.

Subject: East Socorro Draft Grazing Environmental Statement

We have received the above-named draft environmental statement for review and comment. We have distributed copies of the statement to the Natural Resources Department and the Environmental Improvement Division. Comments will be forthcoming from them directly.

We support the proposed alternative.

Sincerely,

Kate Wickes

Kate Wickes
Planning Bureau

KW:jeh

35

Harold L. Quinn
Brownbilt Shoe Store
111 Manzanares Av NE
Socorro, NM 87801

Department of Interior
Bureau of Land Management
P. O. Box 1217
Socorro, N. M. 87801

Gentlemen:

As a private businessman who relies heavily on the rancher for the bulk of my business I am very concerned by the proposed action of the Bureau of Land Management. Not only will the proposed plan have an adverse effect on my business, but on the rancher, the entire community, and - the State of New Mexico!

Since coming to Socorro I have tried to take an interest in the community through participation in civic organizations, city government, and community affairs in general, to help make Socorro prosper.

The magnitude of the loss to the area in economic value by a plan such as you have proposed would be devastating.

Surely this warrants a new study which will, hopefully, give Socorro a boost instead of an economic disaster.

Thank you,

Harold L. Quinn

Harold L. Quinn

IN REPLY REFER TO: 150 704.

United States Department of the Interior
BUREAU OF RECLAMATION

SOUTHWEST REGION
HERRING PLAZA BOX H-4377
AMARILLO, TEXAS 79101

36

MAY 4 1979

Memorandum

To: State Director, Bureau of Land Management, Post Office Box 1449, Santa Fe, NM 87501

From ACTING Regional Director

Subject: Review of Draft Environmental Statement on Grazing Management in the East Socorro Area, NM (Your Memorandum Dated March 16, 1979)

As requested by your memorandum, the Southwest Region of the Bureau of Reclamation (BR) has reviewed the subject draft environmental statement. The following comments are submitted for your use in preparation of the final statement:

Consultation and Coordination/Federal Programs

To establish a better background and for possible inclusion in the consultation and other appropriate sections of the EIS, such as Federal Programs page 1-12, the following information is provided:

Through personal contacts between representatives of the BR's Rio Grande Project (BR-RGP) and the Bureau of Land Management's Socorro District office, the BR has informed the Bureau of Land Management (BLM) that BR has initiated the development of a comprehensive multiple-use management plan for all BR lands within the reservation boundary of Elephant Butte Reservoir, New Mexico. The purpose of the management plan is to maximize the multiple use of the reservoir for such varied interests as soil and water conservation, agricultural, wildlife, fish, and recreation. The comprehensive plan would therefore include grazing. Through Memorandum of Agreement of March 2, 1972, between BR and the BLM, grazing is the responsibility of BLM. Cooperation between agencies is required to implement the management plan and coordinate the overlapping responsibilities of the two Bureau's in the reservoir area.

In developing input, i.e., management suggestions for the reservoir management plans, the BR has met with representatives of various cooperating agencies on several occasions during the period between

November 1977 and December 1978. Many of these meetings were attended by BLM representatives. In addition to these meetings, the Project Superintendent, RGP, also answered in writing several questions on BR and BLM interagency relationships and cooperative agreements proposed by BLM's Socorro District office. A copy of BR's written response to these questions, dated April 12, 1979, is attached for reference.

Reclamation will also meet with individuals holding BR beekeeping permits in early May 1979, and at a later date obtain recreational input from the public and the New Mexico Parks and Recreation Commission for development of a comprehensive management plan for Elephant Butte Reservoir.

Through these contacts, the BR has informed the BLM of Reclamation interests for developing multiple-use management plans for Caballo and Elephant Butte Reservoirs, New Mexico, and the need for cooperation between the two agencies in implementing management projects under their overlapping but separate responsibilities. Within the reservation boundary of Elephant Butte Reservoir, BLM is responsible for grazing while the BR assumes management responsibility for all other aspects. As stated in the Project Superintendent's letter of April 12, 1979, mentioned above, "Consequently, we (BR-BLM) should work closely in developing multiple-use management for the area."

36-1

Page 1-12 Bureau of Reclamation

With specific reference to the Grazing ES for East Socorro, the BLM should mention BR's development of a multiple-use management plan for Elephant Butte Reservoir. A reference regarding the requirement for close coordination between the two agencies in developing and implementing grazing Allotment Management Plans (AMP's) by the BLM and other comprehensive management aspects by the BR should be made. The BLM may want to indicate that final AMP's will not be formulated or implemented for the allotments (250, 261, 272, 277, and 279) on BR lands at Elephant Butte Reservoir until the two agencies have fully coordinated their management responsibilities.

BR's initial draft management plan for Elephant Butte Reservoir will not be completed until the collection of initial quantitative data, which will be sometime in 1980 or early 1981. Reclamation's RGP has informed BLM-Socorro that the earliest this process could be completed is 1980. Consequently, progressive coordination between the two agencies cannot take place until sometime in 1981.

In the above referenced section of page 1-12, the BLM stated the following:

The BR estimates that 10,641 acres of the 23,052 acres would be cleared of vegetation (Final ES, USDI, BR, 1977).

36-2 This statement should be revised. The amount of vegetation proposed for clearing on the BR lands in the Crazing ES area is only 3,825 acres. The amount of acreage proposed for clearing is summarized in Table 6, page A-34, of the Final Environmental Impact Statement, Operation and Maintenance program for the Rio Grande, Velarde to Caballo Dam, Rio Grande and Middle Rio Grande Projects (INT FES 77-8). The proposed BR plans for phreatophyte control are in the Rio Grande Project area, not in the Middle Rio Grande Project area as stated on page 1-12 of the Crazing ES.

36-3 Water control and maintenance of the Rio Puerco in the ES area is probably the responsibility of the Corps of Engineers, not the BR.

Page 1-9 and 1-10 Allotment Evaluation and Flexibility

In these sections it would be appropriate to mention BR's development of a multiple-use management plan for Elephant Butte Reservoir. Here, again, the BLM may want to state that close coordination is required between the two agencies in developing and implementing grazing AMP's by the BLM and other management aspects by the BR. The BLM's development of grazing allotment plans for allotments 250, 261, 272, 277, and 279 on BR lands should remain highly flexible until the BR develops its management plan and coordination can be accomplished. Once the AMP's are established on a cooperative basis, any changes in the grazing scheduled should also be coordinated with the BR.

In recent 1979 onsite Reclamation field reviews, it was determined that a grazing management review with the BLM may be appropriate. Our observations of present range conditions indicate BLM managed grazing lands are severely overgrazed and perhaps a closure of certain lands to grazing may be necessary for a period of time to protect lands, reduce erosion, and to facilitate natural revegetation and seeding efforts.

General Comment

The BR is aware that an intensive literature review and the acquisition of quantitative field data are an expensive and time consuming process. Although the draft Crazing ES has many deficiencies, it does, however, provide a starting point to initiate flexible AMP's that can be changed to varying degrees as additional field and literature data are obtained. Since many sites in the ES area show signs of overgrazing and the consequences of erosion and deposition in the Rio Grande floodplain, the BR feels that the implementation of flexible AMP's could only be helpful to the overall environment of the ES area.

Both the BR and the BLM recognize the limited availability of good perennial forage, especially perennial grasses, in the BR's portion of the Grazing ES area. Current poor range conditions have apparently resulted from the BLM's policy of allowing lessees to utilize all available forage within Elephant Butte Reservoir since the 1950's. If this is to continue as the BLM grazing policy at Elephant Butte, the BR may have to consider the managing of its own lands for grazing in addition to all other surface management aspects.

Page 4-1 Consultation and Coordination

The correct spelling is Mr. Dale B. Raitt, BR, Southwest Region, Amarillo, TX. The comments attributed to Mr. James W. Kirby are incomplete. See the above discussion for a review of contacts between the BR's RGP and the BLM's Socorro District office.

Page 2-1 and Appendix 2 Assumptions and Analysis Guidelines

36-4 In reviewing the Crazing ES, the readers are often reminded that the development of AMP's are based on assumptions, subjective evaluations, and a very generalized literature review. Much of the grazing literature is not relevant to the Intermountain Southwest. The BLM's AMP-development process lacks (1) sufficient quantitative field data and (2) a comprehensive literature review to permit an adequate analysis of the existing environment and to make decisions.

Page 2-37 Soils

36-5 The section of the ES on soils appears to be one of the better sections. The discussion on impacts appears to cover a few acres of developments and neglects the several thousands of acres of range.

Page 2-20 Key Species and Table 2-3 and Figure 2-10

36-6 While the phenological development of key plant species was presented, such developments were not discussed in detail. What is the relationship of the phenological stages and grazing demands by livestock and wildlife? The autecology of important forage species, the synecology of the various plant communities, and the responses of such plants and communities to grazing pressures should be understood prior to the final development and implementation of AMP's.

Page 2-119 Cultural Resources

36-7 Regardless of the size and scope of improvements on BR lands, BR cultural surveys and archaeological clearances are required on all BR lands prior to the construction of improvements.

Visual B Map of Proposed Developments

Proposed developments such as the fence in allotment 272 that are located on the BR's lands requires Reclamation's review and approval prior to implementation.

Visual B Vegetative Map

36-8 The classification of BR lands as a "Waste" vegetative type on Visual B (Vegetation) is inconsistent with the narrative description of waste. The BR lands should more properly be classified as Bosque Subtype, page 2-15 of the ES.

Page 2-20 Threatened and Endangered Plants

36-9 Six threatened and endangered plant species were found in the ES area. Where are these plants located and what steps are being taken to protect their habitat? Are any of these plants located on BR lands?

Page 2-20 Unique Riparian Areas and Table 2-4

36-10 Under the section on unique riparian areas, narrative and Table 2-4, the Rio Grande might be considered a unique riparian area and the Mexican duck should be removed as a species of biological importance.

Map 2-3 Range Condition Classes

36-11 Map 2-3 indicates no range condition class for BR lands. If this is the case, why are BR lands included in the AMP's developed for the five allotments that are composed partly of Reclamation lands?

Page 2-37 Soils

36-12 The 1979 Draft Sierra County Sediment Control Plan gives an erosion rate for the Sierra County portion of the Grazing ES as 0.5 to 1.0 acre-feet per square mile per year (ft/mi^2/yr) while the Grazing ES gives an erosion rate of 0.2 to 0.5 acre ft/mi^2/yr for the same area.

We suggest the potential for erosion as influenced by the development of cattle trails, particularly along canal banks and other project developments, be discussed in the section on erosion.

Page 2-63 Water Resources

This section appears to be well written. The sediment reduction rates and infiltration rates shown on Table 2-14 appear to be high. Although we have no data to substantiate our concern, we suggest this aspect be rechecked.

Page 2-103 Upland Game Birds

36-13 The last sentence of the section on Upland Game Birds states, "The Bosque area along the Rio Grande is an important concentration area for dove, because it provides excellent nesting and roosting cover." What is the supportive reference for this statement?

Page 2-103 Threatened and Endangered Species

As indicated in previous meetings and correspondence, mentioned above, the BR is responsible for fish and wildlife habitat management on the BR lands while the New Mexico Department of Game and Fish is responsible for managing the animal life itself. Presently, the only exception is the Memorandum of Agreement (November 24, 1970) between the two agencies for Elephant Butte Marsh. Since this memorandum is out of date with the deletion of the Mexican duck from the threatened and endangered list, and the BLM has failed to pursue active management in the area, it might be best if another agency, such as the BR, were to assume full responsibility for the management of the marsh and rookery. In regard to management, problems associated with protecting cottonwoods and willows from beaver, shorebird habitat protection from grazing, and enforcement of nesting season closure periods require particular attention and followup.

36-14 On page 2-103, the statement indicates that: "BLM currently has a Habitat Management Plan on the Marsh." The BR, through its various contacts with the BLM, has not been presented a copy of the Habitat Management Plan for review.

Page 2-1 Resource Analysis - Impacts On Wildlife

36-15 A discussion of the potential impacts of the proposed and alternative grazing systems on reptiles and amphibians should be considered.

Page 2-1 Resource Analysis

36-16 Beekeeping and trapping should be discussed as part of direct income derived from the Grazing ES area.

Page 2-98 Wildlife

36-17 Four species of big game were discussed in the opening paragraphs regarding big game; however, only deer and pronghorn were addressed. Additional information should be included describing the other big game mentioned. Other game species immediately adjacent to or in the outer fringes of the ES i include elk, desert bighorn sheep, and wild turkey. More disc a should be directed towards the proposal's impacts on these species. The discussion on wildlife could be improved by a more thorough review of literature and the gathering of useful quantitative field data.

Page 2-102 Competition

In addition to livestock, antelope compete in spring and summer, with heavy competition during the winter months, i.e., little or no available forage. This latter condition could cause doe antelope to abort.

Page 2-102 Birds

36-18 A taxonomic list and more detailed discussion of avian species other than quail and dove, i.e., passerine, waterfowl, shore birds, etc., should be addressed more thoroughly.

Page 2-105 Aquatic Habitat

36-19 The statement that the Elephant Butte Marsh supports a large population of channel catfish, largemouth bass, shad, and carp appears to be an assumption and has not been documented. In addition, white bass should be added to the list of species that occur in the Elephant Butte Marsh.

Page 2-105 Big Game

36-20 In reference to the impact of big game, fencing will certainly inhibit range movement of antelope and deer, but it should be noted that antelope will jump a fence and deer will go under or through a fence when harassed.

In addition to expanding deer and antelope herds with watering areas, it will also attract and concentrate them in the immediate areas.

Table A-6 (Page A-41) Range Condition Allotments

36-21 Where does BR land fall in table A-6 for existing range condition of allotments?

Page A-29 and A-52 Planning System

36-22 In reference to the planning system interrelationships listed on pages A-29 and A-52, the BR's RGP has previously responded to these MFP recommendations. The Mexican duck should be deleted from MFP recommendation 1.2, page A-29.

The Bureau of Reclamation appreciates the opportunity to comment on the Bureau of Land management's East Socorro Grazing Environmental Statement. We hope our comments will further the coordination of management responsibilities at Elephant Butte Reservoir.

D. Hawks

Enclosure

cc: Commissioner, Attention: 150

District Manager
Bureau of Land Management
Post Office Box 1217
Socorro, NM 87801

Project Superintendent, El Paso, TX
(each w/c enclosure)

36-1 BLM has not had an opportunity to review the BR multiple-use management plan. Until the BR management plan is fully coordinated with BLM, the BLM has no idea what impact this will have on the livestock grazing in the affected area. At the present time BLM and BR are still operating under a National and local cooperative agreement whereby BLM is responsible for administration of grazing on BR land. These agreements reiterate the roles of each agency.

36-2 Text changed to reflect the comment (See p. 1-12).

36-3 Text changed to omit reference to Rio Puerco (See Chapter 1, Bureau of Reclamation Section, p. 1-12).

36-4 An Ocular Reconnaissance Range Survey was conducted in the ES Area. This data was used to determine proposed grazing use. A very detailed literature review on grazing was conducted for the ES. Through this literature review it was discovered that very little site specific research was available. The grazing literature indicated that the Proposed Action and alternatives predictions are within the range of biological variability in the western states and are therefore realistic.

36-5 Grazing management's effect on the soils is discussed following the discussion of range developments. The grazing management has beneficial effects on soils as a result of its benefits to vegetation.

36-6 The growth requirements of the vegetation were the primary consideration when developing grazing systems (p. 1-5). The information presented on key species and phenological development is based on collection of field data and research literature. Additional information is available from the District files.

36-7 One fenceline is proposed for construction on BR lands, this project will be subject to Design Feature, No. 2, as described in Chapter 1, p. 1-7.

36-8 These lands in question should be more properly listed as unclassified. A range survey was not conducted on these lands (See Map Errata sheet, p. xiii).

36-9 The plants are not known to be impacted by livestock grazing. The plants are susceptible to collection; therefore, their locations cannot be disclosed. None of the proposed threatened or endangered plants are found on BR land.

36-10 The Mexican duck has been deleted from Table 2-4.

36-11 BLM does not have a method of conducting a range survey and determining range condition classes in this type of vegetation. BR lands were included in the AMPs because BLM has the grazing administration of these lands as stated in the BR/BLM cooperative agreement.

36-12 Map 2-4 presents one sediment yield class for all the soils in a range site. Most of the soils in the Sierra County portion of the ES Area are in the Gravelly-SD range site. Three of the soils in that range site would fall in the 0.5-1.0 ac-ft/mi^2/yr class. The other soils are in the slight class. Because most of the soils in the Gravelly-SD range site fall in the slight class, the map reflects the majority of soils.

Most of the area adjacent to the river is unclassified and was not assigned a sediment yield class because there was not enough data to use the PSIAC Method. Probably most of these soils would have higher sediment yields than those reflected on the map for adjacent areas.

36-13 The Environmental Impact Statement on Operation and Maintenance Program for the Rio Grande - Valarde to Caballo Dam, 1975, written by the Bureau of Reclamation, USDI, p. B114, states that the Rio Grande Valley is an excellent dove production area. It goes on to say that the abundance of nesting sites (trees) is a contributing factor. Page 2-103 now refers to this report. The References section (p. R-6) was also updated to include this report.

36-14 See change in text on p. 2-103.

36-15 A list of reptiles and amphibians found in the ES Area is in the Unit Resource Analyses for the Stallion and Ladron Planning Units. Very little literature is available that would show the impacts of livestock grazing on reptiles and amphibians. However, no significant impacts are anticipated on these species.

36-16 The income from trapping and beekeeping is included under mining and other sectors on p. 2-83 and Table 2-21 on p. 2-84.

36-17 Deer and pronghorn are the only big game species impacted inside or outside the ES Area under the Proposed Action or alternatives.

36-18 As a result of the Proposed Action and alternatives there would be no significant impacts to waterfowl and shorebirds. Passerines and other avian species are discussed commensurate with impacts identified.

36-19 Text has been changed to reflect the comments.

36-20 See Response 27-25.

36-21 See Response 36-11.

36-22 The next time the planning documents for this area are revised or updated the most current information will be used.

37

B.L.M.
Socorro District

why was their so mutch difference between the Range survays made in 1972 and the range survays made for the East Socorro ES statent on allotment no 254

37-1 why was private land belonging in allotment no 256 put in allotment no 303 and listed as 100% Federal range

the B.L.M. spent 2 years writing the East Socorro ES statment. why was the public not allowed more time to study it at least six months to make comments.

Dale Muncy

37-1 The boundaries of the Muncy Community Allotment originally operated by Dale and Cecil Muncy, of which the Carthage Allotment is a portion, is to remain as is until the courts settle the petition suit regarding this allotment. The way it is shown in the ES is subject to change once the petition suit is concluded.

38

Hatley Land & Cattle Co.
—H—
Box 231 Phone 894-3068
Truth or Consequences, New Mexico 87901

May 8, 1979

Mr Arlen P Kennedy
Bureau of Land Management
District Office
P.O. Box 1217
Socorro, N.M. 87801

Dear Mr. Kennedy,

I wish to make my comments on the Environmental Statement for East Socorro.

38-1 I feel the personnel that did the range studies were not qualified and the time they spent on each allotment was inadequate to make any kind of statement.

I don't agree with having AMP's on all the allotments, especially those having a large percentage of deeded lands and State leases, that we pay taxes and leases on, Ranchers who have been in the business know they cannot over graze or they will be hurting their operation, and know by experience what they can do. I am not for office personnel who have no ranching experience

[illegible] from a plan they have worked up on paper, when to move cattle around and how to graze certain pastures. This all has to be done in accordance with the rainfall and conditions, which varies from year to year and cannot be governed by a plan on paper.

Very truly yours,
[illegible] Hatly

38-1 See Response 12-1.

MARMON RANCH
Post Office Box 175
Laguna, New Mexico 87026

May 7, 1979

39

Mr. Arlen P. Kennedy
District Manager
Bureau of Land Management
Socorro Diatrict Office
Post Office Box 2127
Socorro, New Mexico 87801

Dear Mr. Kennedy:

The following are comments I wish to make, which are in addition to my written comments I submitted at the meeting in Socorro on the 17th of April.

My written comments submitted on the above date dealt mainly with the A.M.P. proposed for our allottment, therefore, these comments will be directed to the Environmental Statement as submitted for the East Socorro area.

By using the range survey on our allottment as a basis and without going into detail, I wish to state that I am in disagreement with most of the proposals as stated in the draft Environmental Statement for the following reasons:

1. The range surveys were made during the years that the rainfall was below average. No allowance was made for this fact, which in turn resulted in a faulty evaluation of forage and carrying capacity for the entire area.

2. The time spent in making the range survey was insufficient to make a proper evaluation of forage and carrying capacity of a given area.

39-1 3. The Environmental Statement draft does not provide for treatment of badly eroded conditions that exist on B.L.M. lands.

4. The law that requires the B.L.M. to care for wild horses and burros in this area is ridiculous. Simply because there is no cheap way to care for them and to control the increase in numbers. I think it is inhumane to confine a bunch of horses in a given area when a severe drouth occura. I do not think the Wild Free-Roaming Horse and Burro Act should apply because theae horses are confined and are not roaming free.

5. It appears that the draft Environmental Statement is a document made by B.L.M. to satisfy the desires of a few influential environmentalists. The passage of the Wild Free-Roaming Horse and Burro Act bears this out. The range survey arbitrarily reflects that the entire area is overgrazed. I disagree with the assumption because from my experience ranchers do not let this happen. True, we do have an occasional drouth and the grass gets short, but by a little extra work, reduction of cow units, and feeding supplementary feed, we get out cattle through the dry spells.

On our allottment the rains that fall during the months of July and August seem to solve all our forage problems. This cycle has been going on since the early 1920's. We have noticed the range is in much better shape than it was in the 1920's and '30's.

In view of the above, we need very little supervision or management by the B.L.M. I would like to suggest that the final Environmental Statement contain the following provisions:

1. That the allottee be given authority to do certain needed erosion control work on B.L.M. lands.

2. That the allottee and the B.L.M., after thorough research together determine stocking rates for areas involved.

I am enclosing a map showing Indian allottments and homesteads within and adjacent to our ranching unit (see cross-hatched areas). Some of these lands have changed ownership.

My questions concerning these Indian allottments and homesteads are as follows:

1. Were these original owners of base water ever advised by the B.L.M. that by law they had the right to apply for grazing privileges on adjacent B.L.M. lands?

2. Can present owners of these lands with base water qualify for grazing preference on adjacent B.L.M. lands?

I would like answers to these last two questions as soon as possible.

Sincerely,

Fred Marmon

Fred Marmon

em

Enclosure: as stated.

39-1 The BLM does not propose any mechanical means of erosion control on public land. The reduction in livestock numbers and a grazing management system would allow for improvement of vegetative conditions and an improvement in eroded areas. Past experience indicates that erosion control structures (considering the cost involved) are of marginal help in improving eroded conditions over a long period of time, particularly when livestock numbers exceed the grazing capacity.

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT U.S. FISH & WILDLIFE SERVICE

Memorandum

40

TO : District Manager, Socorro District Office, Bureau of Land Management, Socorro, New Mexico **DATE:** May 9, 1979

FROM : Field Supervisor, FWS. Ecological Services, Albuquerque, New Mexico

SUBJECT: Comments on Draft Environmental Statement-Grazing Management in the East Socorro ES Area.

We have reviewed the draft EIS, Grazing Management in the East Socorro ES Area transmitted by your letter of March 16, 1979. We appreciate the importance shown to the wildlife resources of the region in the alternative formulation, especially in the detailing of an "Enhancement of Sensitive Resource Values" alternative as well as in the Proposed Action. It is our view that any action taken to improve the forage and range condition and to limit erosion and sediment yield would improve the fish and wildlife resources of the ES area. In fact, in coordination with other Federal agencies and private interests, there is an opportunity to rehabilitate the degraded condition of a large portion of the Rio Salado and Rio Puerco watersheds within which the East Socorro ES Area lies. Currently, the Army Corps of Engineers is proposing sediment and flood control reservoirs for the Rio Salado and Rio Puerco; watershed management and treatment programs could negate the need for one, or both, of these dams.

In the summary of impacts, Table 2-1, we note that the alternative designated "Enhancement of Sensitive Resource Values" will, in the long term, provide more grazing use, better range condition, and an increase in wildlife deferred habitat than the Proposed Action. Although the short term impacts of this alternative on the socio-economic structure of the area are greater, in the long term all these impacts will be compensated for, and an actual increase in usage and income of the area will be provided. We believe that the Enhancement of Sensitive Resource Values alternative would best provide the maximum multiple use concept for Public lands in the ES area as mandated in the Federal Land Policy and Management Act.

The Service appreciates the opportunity to comment on this environmental statement.

Bob Pacific

Robert D. Pacific

cc:
Regional Director, FWS, Ecological Services, Albuquerque, New Mexico
Area Manager, Phoenix, U.S. Fish and Wildlife Service, Phoenix, Arizona

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Central New Mexico Audubon Society

POST OFFICE BOX 30002 — ALBUQUERQUE, NEW MEXICO 87190

17 May 1979

Mr. Arlen P. Kennedy
District Manager
Bureau of Land Management
Socorro District Office
P.O. Box 1217
Socorro, New Mexico 87801

Dear Mr. Kennedy;

It is unfortunate to note that much of the rangeland in the East Socorro Grazing Environmental Statement area is in fair to poor condition. We feel that it is in the best interests of the ranchers and the ecology of the area that the range condition be improved as rapidly as possible. The best method of doing this is through extensive management which in most cases would include a grazing management system and a reduction in grazing use to moderate to light. From Valentine (1970) it appears that the most productive rangeland in terms of pounds of forage available per acre is range grazed at a light level. Light Grazing would not only be the most productive for livestock but would also greatly benefit wildlife and provide better watershed and erosion control than what presently exists. We therefore endorse the general action set forth in the East Socorro Grazing Draft Environmental Statement. In addition to the proposed action we would like to see:

1. Elimination of grazing from areas with a critical or severe erosion condition and from pastures which contain deep sand soils.
2. Grazing level be reduced to light in pastures that have greater than 30 percent of the area in poor range condition.
3. Grazing should periodically be excluded from riparian areas for periods of about 5 years to allow replacement woody vegetation (cottonwood and willow) a chance to establish itself.

It is unfortunate that the proposed action will have a short term negative economic impact to the ranchers envolved, but we feel that the range condition needs to be improved and in the long run the proposed action will greatly benefit the ranchers economically. Perhaps low interest loans or other means could be established to help some of the ranchers with a supplimental feeding program until the range improved enough to allow increased stocking.

Specific comments:

1. In reviewing the DES I noted some misinterpretation of the scientific literature. This included:

41-1
a. p. A-50, Table A-10

The value listed for moderate grazing from Reardon and Merrill (1976) is actually for a lightly grazed area.

Valentine (1970) defines the terms light and moderate differently than what is used in the DES, see Table 2, page 8 in the report. The second line of data taken from Valentine should be deleted as this represents the same data as the first.

41-2
b. p. A-51, Table A-12

The data from Reardon and Merrill (1976) represents a change from heavy to light use.

Again the data from Valentine (1970) is the same, the first line should be deleted. Use Valentine's value for proper grazing level rather than moderate.

41-3
c. p. A-51, Table A-13

The data from Reardon and Merrill (1976) represents a change from light grazing to a grazing system.

d. p. A-52, Table A-14

Data from Valentine (1970) could be included. It would be best to average the light and moderate use values which would give a 30 % use figure.

It is noted that four high values were thrown out whereas only one low one was, I think the average lies closer to a 50 % change.

41-4
e. p. A-52, Table A-15

Data from Cook and Stoddart (1963) refers to percent reduction in crown cover Not percent crown cover.

Smoliak et al (1972) refers to the effects of sheep grazing, a paper by Johnston, Dormaar and Smoliak (1971, J. of Range Management 24 185-188) might be more applicable.

Data from Valentine (1970) could be included. See comment d.

2. The reference to Smith (1940) on page 2-108 under small mammals, third paragraph, is not given in the references.

41-5
3. On visual B, the area along the Rio Grande is listed as waste; this should be corrected to broadleaf.

4. Would be helpful to have a glossary of the acronyms used.

5. In the reference section, the reference to Valentine (1970) should read: Agricultural Experiment Station Bulletin 553. 21 p.

The same for Valentine and Gerard (1968).

Thank you for the opportunity of commenting on the East Socorro Draft Grazing Environmental Statement and I am sorry to get these comments a few days late to you.

Sincerely yours,

David E. Lange

David E. Lange
President

xc. Senator Pete Domenici
Senator Harrison Schmitt
Representative Manuel Lujan, Jr.
Representative Harold Runnels
Dr. Dede Armentrout, Southwest Regional Representative, National Audubon Society

41-1 The references to Reardon and Merrill (1976) and Valentine (1970) have been deleted. These were considered as outlyers and do not change the average.

41-2 The references to Reardon and Merrill (1976) and Valentine (1970) have been deleted. Portions of the table have been revised.

41-3 Reardon and Merrill (1976) did not give a value for moderate grazing. Instead, their value for light grazing was used since it more closely represents a moderate or proper stocking rate.

41-4 See text change, Table A-15, p. A-52.

41-5 See Response 36-8.

United States Environmental Protection Agency
Region 6 1201 Elm Street Dallas TX 75270
Arkansas, Louisiana, Oklahoma, Texas, New Mexico

EPA

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April 24, 1979

Mr. Arthur Zimmerman
State Director
Bureau of Land Management
U.S. Post Office and Federal Building
South Federal Plaza
P.O. Box 1449
Santa Fe, New Mexico 87501

Dear Mr. Zimmerman:

We have completed our review of the Draft Environmental Impact Statement (EIS) on the proposed Bureau of Land Management's (BLMs) intensive livestock grazing program for Socorro and Valencia Counties, New Mexico. Under this program some 838,808 acres of public lands would be grazed through the implementation of 79 allotment management plans (AMPs). This program would set livestock numbers on 26 AMP allotments covering 46,142 acres of public land and maintain management of 4,569 acres of public land in no grazing areas. Each AMP would establish the following for each allotment: (1) season of use for livestock, (2) proper livestock grazing use, (3) apportionment of wildlife and wild horse Animal Unit Months (AUMs), (4) allotment and pasture boundaries, and (5) proper grazing treatments. Purposes of the proposed action are to enhance the vegetative resources, improve range conditions, reduce erosion, improve water quality, provide quality habitat for wildlife and wild horses, protect archaeological and historical sites, and provide a continuous supply of livestock forage.

We classify your Draft Environmental Impact Statement as LO-1. Specifically, we have no objections to the project as it relates to Environmental Protection Agency's (EPA) legislative mandates. The statement contained sufficient information to evaluate adequately the possible environmental impacts which could result from project implementation. Our classification will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions, under Section 309 of the Clean Air Act.

Definitions of the categories are provided on the enclosure. Our procedure is to categorize the EIS on both the environmental consequences of the proposed action and on the adequacy of the Impact Statement at the draft stage, whenever possible.

We appreciated the opportunity to review the Draft Environmental Impact Statement. Please send our office two copies of the Final Environmental Impact Statement at the same time it is sent to the Office of Environmental Review, U.S. Environmental Protection Agency, Washington, D.C.

Sincerely,

Adlene Harrison
Regional Administrator (6A)

Enclosure

ENVIRONMENTAL IMPACT OF THE ACTION

LO - Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER - Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to re-assess these aspects.

EU - Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

ADEQUACY OF THE IMPACT STATEMENT

Category 1 - Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2 - Insufficient Information

EPA believes the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3 - Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement. If a draft statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make a determination.

The following section contains comments made at the public hearings and their responses.

SOCORRO HEARING

Index No.	Speaker
1.	Raymond Concho
2.	Ron Martinez
3.	Irma Youngblood
4.	Jerry Schickedanz
5.	Phil Zwank
6.	Kirk McDaniel
7.	Lucille Tigner
8.	Sterling Carter
9.	W. H. Wrye
10.	Will Orndorff - West Central Grazing Permittee's Association
11.	Ross Ligon
12.	Ray Auge
13.	John Fowler

The following individuals elected not to speak at the hearing but did submit written testimony. A copy of this testimony is included immediately following the transcript responses.

14.	Riss Bishop
15.	J. P. Oney
16.	Socorro Chamber of Commerce
17.	Neeley Gray Stone - Patsy Ligon
18.	Will Orndorff
19.	Billy Jack Pound

Socorro written testimony (continued)

20. Earl F. and Mary E. Pound

21. R. L. Morriss

22. Oliver Lee

23. George H. Creel

24. Holm O. Bursum, Jr.

25. Hattie Lacy by Kenneth T. Lacy

26. Virginia Long

27. Simon Siou

28. Fred Marmon

29. Wally Seis

30. Jeanie Seis

31. William M. Seis

32. Charles J. Muncy

33. Salado NRCD

Index No.	Comment	Response
1.	"There is a problem in coordinating the study with local grass roots people, no input from ranchers."	See Response 25-1.
	"There may be inexperienced people producing the study."	See Response 12-1.
	"The study does not take into account the socio-economic characteristics of specific areas. Each area has unique problems. It should include ways to complement affected areas, such as providing for types of financial assistance. An adjustment in the AMP should also reflect an adjustment on the fees."	See Response 31-1.
2.	"Some things have been written which does affect us as people but us being as people do not have that input in a lot of these things that are written."	See Response 25-1.

Index No.	Comment	Response
3.	"Page A-41-42, Table A-6 of the ES, entitled, Existing Range Condition of Allotments, compiled by BLM employees who, your ES indicates, had a 3-day training period in Albuquerque on environmental statement preparation during January 1977 indicates an excessive high percent of range conditions as poor to fair. Our allotment, No. 328, has this figure at 44 percent. Considering the many types of forage and the protection the allotment receives, this is totally unfair."	See Response 20-3.
	"BLM's knowledge of estimated receipts, costs, and net returns per ranch size category for existing environment is as poor as the rest of the ES, Pages A-92 to A-105, Tables A-26 through A-38. I know the exact figures on our cash receipts, cost of operation, including feed, leases, labor, purchases, maintenance and net profit, but can make nothing of the tables pertaining to our ranch operation, per the table, as to the number of cattle allowed on our ranch. Just another report on something poorly prepared and should have been omitted completely, partially to spend more time on BLM business."	The ranch estimates of costs and receipts are averages based on a random sample conducted in the ES Area by New Mexico State University personnel. In no way were these averages related to an individual ranch. Information in Tables A-26 through A-38 was derived from ranch budgets, developed by NMSU, for representative ranches of four sizes: subsistence (small scale enterprises), and commercial ranches that were categorized as small, medium, and large. Extra large ranches were not included in the Statement because insufficient numbers of ranches did not permit analysis, and almost all lands in these ranches were other than BLM lands.

Index No.	Comment	Response
	"I have fed cattle, helped with most of the work involved on a ranch, broke ice in sub-zero weather so cattle could drink, protected the land and wildlife and I am confident we can continue to do so without 15 percent cuts from BLM and a cross-fence that would have no adequate permanent water in the proposed additional pasture. Both cattle and land would suffer from such a fence on account of the added trampling on small areas and because of this proposed cross-fence, cattle would be cut off from the main water supply a part of each year."	According to Visual D (packet in back of book) there would be permanent water in the pastures where the cross-fence is proposed.
	"A number of Socorro Office BLM employees have gone over our ranchland and have indicated that it has not been hurt by grazing. The ES indicates a proposed 15-percent cut in cattle numbers. Can the reasoning behind such a cut be explained in detail? The Range Condition Chart indicates our range is in good condition."	The 15-percent reduction in livestock numbers is based on data from the range survey. The 1975-77 range survey is the only recent survey conducted on the allotment. Table A-6, p. A-42, indicates that 44 percent of the allotment is in poor and fair condition. Also see Response 20-2.
	"Antelope need no special consideration of fences. Since fences were first build, they have traveled with ease to the best grazing in the area."	Numerous papers (Russel, 1964; ZoBell, 1968 for example) have been written that state that fences impede antelope movements and some actually are barriers.

Index No.	Comment	Response
	"Existing improvements on the map entitled "Existing and Proposed Developments" are ignored. I have a well that was drilled in 1932. Why is it not indicated on your map?"	The well was omitted on Visual D and is located in SENE Section 25, T. 4S., R. 3E (See Map Errata sheet, p. xiii).
4.	"Under the No Action Alternative it is implied that allotments without AMPs would not improve and that utilization would be heavy. But in reviewing the Table A-1 in the Appendix, it is noticed that the allotments where AMPs had not been in existence are the only allotments receiving an increase in livestock AUMs. Percentage-wise, if one makes the assumption that plus or minus 10 percent increase or decrease from no change is within the allowable error, the allotments without AMPs, or 39, would receive reductions and 12 would remain static or 77 percent receiving reductions and 23 percent remaining static. Using this same assumption in looking at the existing AMPs, 19 would receive reductions or 76 percent, and 24 percent, or six, would remain static. This would indicate from this table alone that the existing AMPs are not evidence of improved management over the permittees' management."	The BLM is committed to the decision that will be reached after the Final Environmental Statement is filed. The existing AMPs are not successful because of lack of funds for range developments, livestock exceeding the grazing capacity, BLM not properly supervising the AMP, lack of cooperation from the allottee and other factors.

Index No.	Comment	Response
	"Although there are some problems within the ES Statement revolving around the methods to convert from existing BLM data to the range site concept, a problem exists in converting from range types to range sites. A range type map is a map of present vegetation, as changes in vegetative composition due to range improvements or invasion of brush, etc., can result in a type designation change such as a grassland type changing to a pinyon-juniper type. A map based upon range sites is a map of land capability. In terms of vegetation, it expresses the potential vegetation or what could grow, not necessarily what grows there now. From this standpoint, what is the difference between range types, such as BH-38 and BH-40, as compared to a loamy range site? Problems in these conversions have resulting impacts in the calculation of the final carrying capacities."	Grazing capacities were not calculated using this method. Vegetative potential production and range condition classes were determined using this method. Grazing capacity figures were determined from the range survey data explained in the methodology section of Appendix 1 beginning on p. A-8.
	"The Environmental Statement has been a summary of all proposed BLM alternatives. In the statement process, is there a means for rancher submitted alternatives that would meet the goals and objectives of multiple-use management be considered?"	In the New CEQ regulations there is a scoping process for the proposal and alternatives and the issues to be analyzed. The proposal and alternatives in the ES Area have been scoped in the past and ranchers as well as others were asked for early comment which might be helpful to the ES team in the development of the ES (Letters sent out June 27, 1977). The comments received early in some cases have been helpful; however,

Index No.	Comment	Response
continued		often they were of an emotional nature and had no suggestions for development of alternatives which would still meet the goals and objectives of multiple-use management. This early information received is summarized in Chapter 4, pages 4-1 through 4-3.
6.	"In the description of Range Survey Methodology, it is stated that the measurements of density were taken using this (step-point) method. How is this possible when density is a measurement of plants per unit area and a point cannot give area?"	See definition of Density in Glossary on p. G-2.
	"Cover also needs further definition."	See Response 27-49.
7.	"On page A-3 of the East Socorro Environmental Statement it states that no reduction is needed on the allotment at this present time. However, on page A-84 it states that a reduction is planned in the long term. It seems to me that if a reduction is not needed at the present time, it is ridiculous to say that a reduction is needed in the long term."	Table A-24 on p. A-84 has been updated with the correct data for the long term. Data for determining potential production (long term) on most of the ES Area was based on the range survey. Where actual use, utilization, and trend studies information was available, as on the Sheep Canyon Allotment (261) long term should have been based on the present use.

Index No.	Comment	Response
8.	"The EIS is not current in its figures and information concerning the Elephant Butte Marsh; therefore, it is inadequate and needs to be updated. The 800-acre size of the marsh is nearly double its actual size."	The amount of water in Elephant Butte Marsh has fluctuated over the years. This was the amount of water in the marsh when the ES was initiated. When the proposed action is implemented, current figures will be used to indicate livestock grazing capacity.
	"The Mexican duck is no longer of biological importance because the New Mexico Department of Game and Fish has determined that the duck thought to be an endangered Mexican duck, was only a mallard hydrid cross."	See Response 36-10.
11.	"Number five, finanacial impact on operations has not been considered at all."	The financial impacts have been addressed for operators in a particular ranch size category based on ranch budgets for representative ranches of four sizes: subsistence (small scale enterprises), and commercial ranches that were categorized as small, medium, and large. It was determined that the primary financial impacts from livestock adjustments are on the operators. See discussion of impacts beginning on p. 2-87.

Index No.	Comment	Response
12.	"Second, we have an EIS which is very informative on a lot of things, but something we do not have which I feel is very important and that is an ES, Economic Statement. I question, gentlemen, what is going to happen to the small grocery store, the service station, the small general store, the bars and the repair shops in towns like Corona, Magdalena, San Antonio, Willard, Vaughn, et cetera, et cetera, et cetera."	There is no way, with our existing data, that we can determine what will happen to the small town businesses.
13.	"As Ray said, it's very hard to determine the impacts on the local economy, on the regional or the State, nationwide, whatever. But this should be attempted, gentlemen. We must get an idea on, you know, these multipliers. What are the multipliers, what is the sector in your action undergoing from the ranch industry, to transportation, to all the other sectors currently in the State. And you know, until these multipliers are at least attempted to be determined, in my opinion, you have not made an adequate attempt to represent this local community and its inner actions with the State."	An economic model (input-output model) was developed and used by Dr. James Gray from NMSU to determine existing economic conditions and to stimulate long-run production patterns under the Proposed Action and alternatives with special emphasis in the ES Area. The input-output approach together with its multiplier as determined in page 21 of support document, dated March 25, 1977, estimates the interrelationships between individual economic sectors. This permits estimating impacts on total economy of an expansion or contraction of an individual economic sector.

Index No.	Comment	Response
continued	"Going on, in Appendix A, p. 47, one of the assumptions that you have used, is the assumption of the Proposed Action reducing utilization from a heavy to moderate level, and I feel that this is a very crucial assumption. The inventory process should certainly be initiated to justify this type of an assumption."	The range survey indicates heavy utilization (60-80 percent). The Proposed Action utilization of key species would average 50 percent (40-60 percent utilization is in the moderate category).
	"Now, upon looking at this table (Table A-10) in further scrutiny, you will find that there are approximately eight data sources referenced in this table and four or five relevant sources of data in the area were kicked out as outliers. My first question is, gentlemen, what process did you use to statistically justify an outlier? And in the four remaining pieces of information that were used to determine the 51 percent, upon further scrutiny you find that it is just one author, a gentleman named "Klipple". The research was done in 1961 and it was done in the Central Great Plains area. So not only is the data outdated, it is not species specific to the East Socorro Area and this again, gentlemen, is a very crucial part of your work. So you have a crucial assumption on the fact of whether it was overgrazed to a moderate movement and secondly, on the increase in productivity that can be anticipated."	The outliers were justified based on experience and observation in the field.

Index No.	Comment	Response
14.	"Concerning my personal situation, little or no attempt to question me as to my view of the overall grazing practices and methods of operation which I have used and prospered by over the past 40 years."	See Response 25-1.
	"I do not question the intent of the people who performed the process of collecting the material used in this statement, but I do question their superiors' poor judgment in sending to my ranch very inexperienced personnel."	See Response 12-1.
15.	"I am one of the smaller operators which is referred to on page 2-91, column 1, paragraph 4. It states that we are less dependent on income derived from ranching and, therefore, less affected by a reduction in grazing. In my case this could not be further from the truth, for I am totally dependent on my ranch for my livelihood."	See Response 28-19.
	"I can only see that from implementing the Proposed Action we smaller operators will be forced from our operation to be bought up by larger operations. This can only serve to continue to monopolize the cattle industry which at this time is badly in need of competition. No serious consideration of my situation was taken into account in the writing of this Impact Statement."	Individual ranches were not addressed specifically but were categorized by ranch size. Table 2-26 relates to transitional effect of ranches as each action would be implemented. Pages 26-28 of support document, dated 10/25/77 states anticipated impacts indicated by ranchers that would apply to all ranch sizes.

Index No.	Comment	Response
	"I do not believe that the personnel involved in the process of securing information for this statement were adequately prepared for an undertaking such as this.	See Response 12-1.
	"This statement as I have understood has little or no input of the people who are the most effected by its implementation. I can only fault the BLM for its lack of thoroughness in not personally contacting the permittees."	See Response 25-1.
18.	"The range survey, AMP and proposed cut were all done on my allotments without my knowledge. I was not notified what day or days the survey teams would be on my ranch. The law and regulations both say the rancher is to be consulted and the BLM personnel are to cooperate with the rancher in formulating plans, etc., for his allotment. Why was I not notified of the survey date, consulted on the AMP plans, etc.?"	See Response 25-1.
19.	"I would like to know why the impact of recreational vehicles (ORVs) on the public lands in question was not entered into the EIS."	See Response 28-25.

Index No.	Comment	Response
	"Secondly the economic impact on the members of the community surrounding the public lands in question were not sufficiently mentioned. Why wasn't the dollar value of the numbers of cattle to be removed from the public lands mentioned, along with the estimated impact of this financial loss to the business community not directly related to the affected industry?"	The dollar value of cattle to be removed from public land is stated in Table 2-24, p. 2-88 of ES. The impact sections dealing with employment and income were re-written to put into perspective the jobs lost as they relate to the total number of employed in the ES Area and the income from grazing as it relates to the total income for Socorro County (See pp. 2-87 and 2-91).
	"As for tradition and history, some of the ranches and families whose lifestyle and livelihood are to be put on the line by those proposals within the E.I.S. I am interested in knowing if this tradition and history is important enough to be considered and mentioned."	The impacts on lifestyle are addressed beginning on p. 2-95.
20.	"Regarding the Environmental Statement - The average proposed cut of cattle is 33 percent. This would force the producer to market these cattle, the sale of these cattle would also force the producer to pay excessive income tax, causing a two-fold hardship on the allottee. I would like to know why this was not mentioned in the E.I.S."	This was not considered a significant impact in the ES Area since it would mostly affect those operators who would be taking a large cut over a 3-year period. The amount of income tax would not have to be paid all at once.

Index No.	Comment	Response
	"Why in the East Socorro Grazing E.I.S. was the subject of racial/ethnic composition of the BLM permittees addressed? And what bearing has this subject on the Environmental Impact of livestock grazing on public lands?	This was included to give a better description of the population composition of the livestock operators.
	"On page A-41, Table A-6, Existing Range Conditions. Allotment No. 268 is under the heading of good and fair condition. Why is this allotment being cut so drastically when range surveys has no poor range condition?"	See Response 20-3.
21.	"Why didn't the permittee have any input in this EIS?"	See Response 25-1.
22.	"In all of this discussion, why was there no projected effect on livestock performance and what would that performance be expected to be?"	Improvement in range condition should be reflected in improvement in livestock performance. The goal of grazing management is improvement of range conditions.

Index No.	Comment	Response
	"(2) It appears that the Bureau intends to apportion any increase in numbers in some manner but this is not specified adequately. Legally is the permittee entitled to all of the increase up to the original adjudication under his preference and in the absence of any water base, could this be apportioned to another individual?"	As stated on p. 1-5, increases in vegetative production would be considered for all resources and resource users. It would be apportioned according to the updated management framework plan (MFP). Forage allocated to livestock grazing would be administered according to regulations in the Code of Federal Regulations (CFR) 4110.3-1.
	"(5) Various systems of AMPs have been chosen, but due to the discussion of the equal effect of all systems, how much input did the permittee have in that choice?"	See Response 25-1.
	"(9) Your statement on informal conversations revealing less than authorized use is misleading. Why was not an explanation given about the possible excess use that would counter balance this?"	See Response 12-3. Socorro District records indicate that trespass is not a problem and is insignificant in terms of impact analysis for the ES Area.
	"(10) A discussion is also made on the need of capitol to improve or expand or even maintain an operation and yet there is no discussion as to the relationships of net income and those capitol needs. Why not?"	Such a discussion can be found in the support documents prepared by Dr. James Gray from the New Mexico State University.

Index No.	Comment	Response
	"(11) Does it cost less to run a place cut 30 percent and if so, how much less?"	A marginal analysis of the individual ranch would have to be made to determine if marginal cost would exceed marginal revenues or if the reverse is also true.
	"(12) The feelings of the financial institutions are given in a very narrow view, only including the placement and cost of improvements. What would be their feelings on the loss of permit value, the loss of actual management of the operation, the loss of that capitol which is a net return that is to be used for indebtedness? Would they be willing to finance operations in the future if the Bureau exercised this control, and if so at what level?"	BLM has no way of knowing what the financial institutions will do in a given situation.
	"(13) As for consultation and cooperation, an item stressed by the Bureau, not all permittees were contacted. Why was it not felt that this was the most important aspect of a working relationship to do so?"	See Response 25-1.
	"A great deal of experience is needed in the use of these surveys, how much experience was there in the survey crews and was there a requirement for a certain amount before a member could be a part of the survey team."	See Response 12-1.

Index No.	Comment	Response
	"(18) After the survey was done, why were just certain systems chosen? In grama grass country studies, they show an increase up to a certain point under yearlong grazing. Why was this not considered as one of the alternatives?"	The intention was to tailor each system to each allotment and the growth requirements of the vegetation. Yearlong grazing was not considered because very little of the ES Area is strictly grama grass. Other resource values have been taken into consideration when developing the system.
23.	"Since all permits were originally adjudicated at a certain number and since many of these numbers have been reduced, how is the increase to be apportioned up to the adjudicated number? Also, how are the numbers going to be apportioned above that adjudication? Since the EIS doesn't address this possibility, does the permittee not have the preference right of all increase up to the adjudicated number?"	See second response under Index speaker No. 22.
	"In the lengthy discussion of grazing systems, much literature is quoted as to the effects of the various systems on the range resource. Why was it not felt that this discussion should also include the effects these systems have on livestock performance and are not these largely detrimental?"	See first response for Index speaker No. 22.

Index No.	Comment	Response
25.	"Allotment 298 your survey showed that only 34 percent of total allotment was in fair to poor condition - then why is a 49 percent reduction mandatory?"	See Response 20-3.
	"#2 on the proposed 49 percent range reduction why wasn't your figures of range potential on page A-58 E.S.E.S. used in deriving AUM cuts?"	The proposed livestock grazing numbers are determined from the range survey data. BLM has no method to set livestock numbers from range potential.
	"#3 Considering allotment 298 why wasn't the total ranch used in your analysis?"	For the range survey and AMPs, the analysis was primarily restricted to those pastures that have public land. Pastures that had all private and/or State land were not included. In the economic analysis the entire allotment was analyzed. It was necessary to include these additional acres and AUMs to arrive at a more valid total direct income in the entire ES Area. For further explanation see page 2-2, last paragraph under Impacts - Assumptions and Analysis Guidelines.
	"#4 If it was your intention to use total allotment #298 in your survey was it negligence on your part or was your study not complete for this allotment?"	See third response under Index speaker No. 25.

Index No.	Comment	Response
	"#5 As your statement don't include all of allotment #298, how did you arrive at your AUM cuts?"	See third response under Index speaker No. 25.
	"#9 Overall in E. Socorro there has been an approximate total of 4300 herd AUM prop cuts. Has this drastic economy cut been considered in your statement?"	The impacts of the proposed livestock reduction have been analyzed in the Socio-Economic Section beginning on page 2-81.
26.	"When I personally have had many years experience on improving this ranch, why was I not consulted by the BLM on the proposed improvements?"	See Response 25-1.
	"Why does the BLM assume a young man fresh out of college will have all the answers?"	See Response 12-1.
29.	"Also in the Environmental Statement I noticed very little on the prairie dog's effect on the environmental and range grasses."	The ES was written on the impacts of livestock grazing and related activities on other resources. Prairie dogs are not causing any significant impacts.

Index No.	Comment	Response
31.	"I firmly believe that these figures were predetermined and brought on by pressures from other environmental groups, since in no case that I am aware of, were actual use figures used nor were operators contacted."	The livestock adjustments were determined from the range survey data. This data is on file in the Socorro District Office (Also see Response 25-1).
	"Also, to prove the fallacy of these studies, Vegetation Maps, Visual B, show large areas of mesquite where none exists."	The mesquite vegetative type in the Arroyo Colorado Allotment (129) has been checked and is correct. Vegetative types are delineated by their aspect; the species would indicate the aspect or general appearance of the type. Although mesquite is not abundant in the area, according to the BLM Method, it is a mesquite type.
	"And maps on page 2-26 on range condition classes show areas to be poor which are better than lands shown to be fair, and visa versa."	See Response 20-3.
32.	"To determine sediment yield and possible erosion, what reference areas were used to compare the East Socorro area?"	Sediment yield was estimated by the PSIAC Method (see Appendix 3). The nomographs which were used to estimate sediment yield were field tested by Ronnie Clark of BLM's Denver Service Center. These nomographs were used to develop relative ranges of sediment yield

Index No.	Comment	Response
continued		values in the East Socorro Area. Geologic erosion is occurring and is difficult to monitor. PSIAC Methods address other erosion actions occurring.
33.	"How qualified were the range conservationists collecting the data? How much experience did they have? Were the same range conservationists used through the whole E.S. process (in other words did the quality of the work have continuity to it)? Did the individuals compiling the data and writing the E.S. have a chance to see all of the allotments in the field first hand?"	See Response 12-1.
	"(6.) While collecting data for the resource analysis the BLM employees collecting the data should be required to work with the rancher directly. He should attempt to have the rancher present to assist in the data collection whenever possible. This would help the BLM-rancher relations and also inform the rancher how the trend and condition of his range is determined."	See Response 25-1.
	"The rancher should also be worked with very closely in determining any plan of operations and management which is proposed on his ranch."	See Response 25-1.

Bureau of Land Management
Socorro District Office
P. O. Box 1217
Socorro, New Mexico 87801

April 23, 1979

The conclusions drawn by the East Socorro Grazing Environmental Statement will cripple the cattle industry in central New Mexico.

Concerning my personel situation little or no attempt to question me as to my view of the overall grazing practices and methods of operation which I have used and prospered by over the past 40 years. I do not question the intent of the people who preformed the process of collecting the material used in this statement, but I do question their superiors poor judgement in sending to my ranch very inexperienced personel. It is inexcusable that in such a crucial situation the Bureau of Land Management would use individuals direct from college with little or no experience in operation of a working cattle ranch. This can only lead me to believe that the Bureau rushed to publish this statement in order to satisfy outside interests who have no appreciation of just how damaging these new regulations can be to my ranching operation.

To my knowledge the BLM spent less than a week surveying my ranch. I believe there is no possible way that in such a short period of time anybody can make a correct evaluation of the range trend, or stocking rates. I am in constant contact with my operation and these decisions are difficult at best.

If this is the way the BLM Proposes to manage the vast lands to be intrusted to their care, I fear the cattle industry in the western lands has come to an all time low.

This statement leads us to believe that hobby ranching is the rule rather than the exception. I as a cattleman can testify to the fact that ranching is a fulltime job that cannot be successfully practiced on a part-time basis, especially by inexperienced people with no real attachment to the land which I have spent a life time caring for. I do not believe the BLM can effectively operate my ranch by carrying out the proposed action in this grazing statement. I believe this statement should be tabled and the proposed action be delayed until a more complete and realistic statement is compiled by experienced, knowlegeable personel, who understand the ranching situation.

Some reference was made to creating new wilderness areas in parts of the Socorro grazing district. I am adamantly opposed to this action and believe such areas should not be incorporated into the wilderness management program.

Sincerely,

[signature]
Miss Bishop

Bureau of Land Management
Socorro District Office
P. O. Box 1217
Socorro, New Mexico 87801

April 23, 1979

Dear Sirs,

I have reviewed the East Socorro Grazing Environmental Statement and found it very inadequate. It was a one-sided account which could only be described as a serious blow to ranching and private interprise in these United States. Government bureaucrates have found another way to regulate our lives.

Since purchasing my ranch in 1957, I have steadily and without government intervention, improved the range. This has had several positive impacts on my ranch, for cattle as well as for wildlife.

I am one of the smaller operators which is referred to on page 2-91, column 1, paragraph 4. It states that we are less dependent on income derived from ranching and therefore less effected by a reduction in grazing. In my case this could not be further from the truth, for I am totally dependent on my ranch for my livelihood. I can only see that from implementing the proposed action we smaller operators will be forced from our operation to be bought up by larger operations. This can only serve to continue to monopolize the cattle industry which at this time is badly in need of competition. No serious consideration of my situation was taken into account in the writing of this Impact Statement.

I do not believe that the personel involved in the process of securing information for this statement were adequately prepared for an undertaking such as this. I resent the fact that these young individuals who preformed the range survey used in this statement were given such unlimited power over my livelihood without on the spot supervision by their superiors.

This statement as I have understood has little or no imput of the people who are the most affected by its implementation. I can only fault the BLM for its lack of throughness, in not personally contacting the permitees.

In my opinion this statement lacks throughness, sensitivity to individual problems, was hurridly compiled with inexperienced personel and must be totally reevaluated before any proposed action is implimented.

Sincerely,

J. P. Oney

J. P. Oney

CHAMBER OF COMMERCE
103 Francisco De Avondo
Socorro, New Mexico

April 20, 1979

ECONOMIC IMPACT STATEMENT

(East Socorro Area)

The proposed action of the Bureau of Land Management on the East Socorro Area will have a drastic effect on the local economy of Socorro. It is our opinion that the decisions reached in the EIS for East Socorro are inadequate since decisions were based on information gathered from a brief visit to each ranch. We feel the information should have been compiled over several years to show a trend in the industry.

It is our understanding that the present carrying capacity for this area is 14,224 head of cattle and that the proposed carrying capacity will be 9,935 head; a cut of 4,289 head of cattle. This drastic cut will reduce the gross annual sales by $1,640,250. The overall effect of such a loss to this community will be staggering.

The Federal Government owns 52.2% of the area, 30% is privately owned and 17.8 % is owned by the State of New Mexico. The decisions to make the large cuts on these ranches effects the production from lands not owned by the Federel Government.

It is our recommendation that the EIS for East Socorro be declered inadequate and that new studies be done using uniform methods which have been proven successful.

Jean Stanley, President
Chamber of Commerce
Socorro, New Mexico

April 24, 1979

BUREAU OF LAND MANAGEMENT
P.O. Box 1217
Socorro, New Mexico 87801

Ladies and Gentlemen:

I am Patsy K. Ligon, representing the La Jencia Allotment No. 059 which my 81 year old mother, Neeley Gray Stone is a partner, along with my husband, Ross Ligon and myself. Due to her hearing problem, I am here to voice her opinion in regards to the Environmental Statement of our proposed cut of 122 head of cattle.

NEELEY GRAY STONE'S Testimony

(1) I am 81 years old and [redacted] dependent on income from ranching for my livelyhood. With the proposed cut, I would not have anything. BLM what do you propose for me to do?

(2) The mental anguish that this has imposed on me and my family is almost unbearable.

(3) Throughout the 23 years we have lived on the ranch with Allotment No. 059, we have built fences and done thousands of dollars of S.C.S. work for soil erosion, dams, tanks for watering and pipeline construction. In addition to this, we have ~~purchased~~ sixteen more sections of land, and all of this has been ignored by the BLM and with the proposed cut, we will have less than we started with 23 years ago.

(4) We had a Management Plan and abided by it to the tee. We did nothing but improve out allotment through the years, spending thousands of dollars, time and energy to save the soil and vegetation thereon. We are ending up in almost bankrupt conditions. This proposal has devaluated our ranch by $122,000.00

Neeley Gray Stone

Neeley Gray Stone

April 24, 1979

BUREAU OF LAND MANAGEMENT
Socorro, New Mexico 87801

My name is Will Orndorff. I am a rancher in the East Socorro area and at the present time I have cattle on allotments numbered 260,310,330 and 360. The range survey, AMP and proposed cut were all done on my allotments without my knowledge. I was not notified what day or days the survey teams would be on my ranch. The law and regulations both say the rancher is to be consulted and the BLM personnel are to cooperate with the rancher in formulating plans, etc. for his allotment. Why was I not notified of the survey date, consulted on the AMP plans, etc.?

There is privately owned land in the pastures that the BLM has proposed range improvements. Why was I not consulted on these improvements? Especially where water development is recommended. I have two wells on one pasture on allotment #360. There is a proposed pipeline on this allotment bringing water from my neighbor's well. That is a sign of actual stupidity and lack of knowledge by the BLM planner.

The following questions apply to allotment # 360:

(1) Where are the reference areas that were used to determine the forage acre requirements for my allotment?
(2) How many years of data and what method was used to collect the data from these reference areas?
(3) What type of grazing system has been used in the reference area?
(4) What are the major types of forage or vegatation in the reference area?
(5) What are the major types of forage or vegatation in my allotment?
(6) What was the range condition of the reference area?
(7) Who managed the reference area?
(8) Has there been a change in the specie composition or ground cover in the reference areas?
(9) Does the reference area have any wildlife on it? If the answer is "yes" how many and what kind are present? How about rodents?
(10) What is the trend and condition of my allotment?
(11) How was it measured or determined?
(12) How many visitations and surveys were made to determine the trend?
(13) In conducting the "Ocular Reconveyance" method of evaluation on my ranch, were the "Interagency" regulations used or did the BLM follow their own procedures?
(14) How many transects were used per sub type in each pasture of my allotment?

(15) Are the transects marked in a permanent manner so the trend can be checked in future studies?
(16) The time alloted for public comment has been too short. We need at least one year to study the East Socorro ES. When the BLM required over two years to make this ES, why is the public limited to 45 days?

Thank you for this opportunity to appear and present my views and questions.

Will Orndorff

Will Orndorff

April 24, 1979

In regard to the E.I.S. filed by the B.L.M. . I wish to make a few comments and ask a few questions.

I would like to know why the impact of recreational vehicles (o.r.v.'s) on the public lands in question was not entered into the E.I.S.

Secondly the economic impact on the members of the community surrounding the public lands in question were not sufficiantly mentioned. Why was'nt the dollor value of the numbers of cattle to be removed from the public lands mentioned., along with the estimated impact of this financial loss to the Business Community not directly related to the affected industry.

As for tradition and history, some of the ranches and families whose lifestyle and livelyhood are to be put on the line by those proposals within this E.I.S. I am interested in knowing if this tradition and history is important enough to be considered and mentioned.

Billy Jack Pound

Billy Jack Pound
Box 363
Socorro, New Mexico
87801

April 24, 1979

Regardin the Environmental Statement - The average proposed cut of cattle is 33% . This would force the producer to market these cattle, the sale of these cattle would also force the producer to pay excessive Income-tax, causing a two-fold hardship on the Allotee. I would like to know why this was not mentioned in the E.I.S. .

On Allotment # 268 we have 4 (four) new livestock waters located on Section's 7 - 9 - 10 - 11 - 2 west - T-5south. The Bureau incurred no expense and refused to assist us in establishing these permanent waters. Why in the E,I.S. was this fact not mentioned or taken into consideration to determine the proposed permit cuts on allotment #268.

Why in the East Socorro Grazing E.I.S/ was the subject of Racial/ethnic composition of the B.L.M. permittees/addressed. And what bearing has this subject on the Environmental impact of livestock grazing on Public Lands.

On page 2-25 range condition classes map allotment #268 falls into good and fair class.
On page 2-25 allot. #268 is in the slight to medium sediment yield class.
On page A-41, table A-6 existing range conditions. allot. #268 is under the heading of good and fair condition.
Why is this allotment being cut so drastically when range surveys has no POOR range conditions.

Earl F. Pound

Mary E. Pound

Mary E. Pound
Box 363
Socorro, New Mexico
87801

April 24, 1970

TO: BUREAU OF LAND MANAGEMENT
SOCORRO, NEW MEXICO

FROM: R. L. Morriss
Quemado, New Mexico

If the purpose of the EIS and its implementation is to improve the land, why is not the permittee given an incentive to do this? Without the permittee's cooperation, nothing will improve.

Each allotment has a preference number. Since the land does not produce the same amount of forage each year, this number should be flexible up or down.

Why wasn't more time used to complete the EIS Statement since many statistics were not available?

Why haven't the AMP's been successful?

Why will reductions be made even though trends are up?

Why didn't the permittee have any input in this EIS?

R. L. Morriss

April 24, 1979

Department of Interior
Bureau of Land Management
P.O. Box 1217
Socorro, New Mexico 87801

Dear Sirs:

I feel that the East Socorro EIS is completely inadequate.

The following questions need to be adequately answered before any action should be taken as a result of the study.

(1) A lengthy discussion of various literature sources is made, mostly from Heady, on the effects of the various grazing systems on the range resource. In all of this discussion, why was there no projected effect on livestock performance and what would that performance be expected to be?

(2) It appears that the Bureau intends to apportion any increase in numbers in some manner but this is not specified adequately. Legally is the permittee entitled to all of the increase up to the original adjudication under his preference and in the absence of any water base, could this be apportioned to another individual?

(3) It would seem that an upward trend in condition is the primary concern and yet in the absence of any type of monitoring system for a base judgement, why was it not felt important enough to include the establishment of such a system in the original survey?

(4) Also, in conjunction with this, why was no statement on past history of the area included, such as the reoccuring dust and sand storms on the Jornada in the early fifties and is it due to increased ground cover that these no longer occur?

(5) Various systems of AMP's have been chosen, but due to the discussion of the equal effect of all systems, how much input did the permittee have in that choice?

(6) Since the Rangelands Improvement Act mandates cooperation, is it anticipated that the AMP's will not be enforced until such time as an agreement can be reached?

(7) Continually in the no action alternative, it is anticipated that little or no improvement will be done to the resource. In light of past history, for instance, on fencing, a projected 14 miles is anticipated

and yet over the past 100 years an average of 305 miles has been built, how do you reconcile these figures?

(8) Why was no projection made under this alternative as to the improvements to be placed on private or state land in that time, and what bearing would this have on the use of the government land?

(9) Your statement on informal conversations revealing less than authorized use is misleading. Why was not an explanation given about the possible excess use that would counter balance this?

(10) A discussion is also made on the need of capitol to improve or expand or even maintain an operation and yet there is no discussion as to the relationships of net income and those capitol needs. Why not?

(11) Does it cost less to run a place cut 30% and if so, how much less?

(12) The feelings of the financial institutions are given in a very narrow view, only including the placement and cost of improvements. What would be their feelings on the loss of permit value, the loss of actual management of the operation, the loss of that capitol which is a net return that is to be used for indebtedness? Would they be willing to finance operations in the future if the Bureau exercised this control, and if so at what level?

(13) As for consultation and cooperation, an item stressed by the Bureau, not all permittees were contacted. Why was it not felt that this was the most important aspect of a working relationship to do so?

(14) Probably the most inadequate part of the range survey was the actual range study. Paced transects have been shown to be the most inaccurate methods chosen instead of locating permanent ones and thus having a permanent base for future comparison. Why was this not done?

(15) Were the sites chosen selected at random or chosen by the individuals who ran the survey?

(16) A great deal of experience is needed in the use of these surveys, how much experience was there in the survey crews and was there a requirement for a certain amount before a member could be a part of the survey team?

(17) In Humphrey's studies on fire and the ecology, he quotes a trial in which the same individual had an error of 16% on the same measured transect, what kind of an error factor could be expected on a paced transect?

(18) After the survey was done, why were just certain systems chosen? In gramma grass country studies, they show an increase up to a certain point under year long grazing. Why was this not considered as one of the alternatives?

(19) How do you equate or reconcile the study results with the actual situation? A reduction of 50% to utilize only 1/2 of the available forage implies a previous utilization of 100%. Over a forty year period from the inception of the Taylor Act until the present, that level of use would seem to have left an area totally divided and yet the trend of the area seems to be stable with 80% classified as fair or better. How can this be reconciled or justified?

(20) In the absence of sufficient funds for the implementation of the anticipated improvements under the proposed action, what is the anticipated effect? Also in line with this, why was not any discussion included as to the effect of the anticipated fuel shortage and how would this affect the proposed action as far as implementation and future management given the anticipated need for 18 more employees and resultant needed vehicles?

(21) Even under the Rangelands Improvement Act, with $15,000,000 annually authorized, and if this is appropriated, that would be 10¢ an acre for improvements which would be $86,000 annually for the EIS area. If 80% or $69,000 is actually used over 20 years, given the rate of inflation, is that going to be sufficient funds?

(22) Also, why was not a discussion given on the problems of placing improvements on private and state land with federal money. What are the legal problems inherent in such a situation? What are the legal problems associated with taking water from private land by pipeline and placing it on public land given the recent court ruling on the Forest Service having no presumptive right to that water?

(23) How can you expect an individual to respond in 45 days to a statement that took over two years to prepare?

In light of these questions and the absence of adequate answers, it would be advisable to grant a one year comment period and the study should be redone with adequate time and money to accurately reflect the actual conditions of the area.

Oliver Lee

Oliver Lee

April 24, 1979

BUREAU OF LAND MANAGEMENT
Socorro, New Mexico 87801

Dear Sirs:

I am 72 years old and have been a rancher all of my life. My wife and I operate the Creel Ranch in East Socorro Area, and are very concerned about the ES for this area. There are saveral areas of controversy, however, because of the lack of tima to comment and because of the technical material that needs to be raviewed, I will make only a few comments at this time. In line with what I have just said, I recommend that the public be given six months to a year's time to prepare comments on the EIS.

Since all permits were originally adjudicated at a certain number and since many of these numbers have been reduced, how is the increase to be apportioned up to the adjudicated number. Also, how are the numbers going to be apportioned above that adjudication. Since the EIS doesn't address this possibility, does the parmittee not have the preferance right of all increase up to the adjudicated number?

In the lengthy discussion of grazing systems, much literatura is quoated as to the effects of the various systems on the ranga resource. Why was it not felt that this discussion should also include the effects these systems have on livestock performance and are not these largely detrimental?

Finally, I would like to know more about what the effects of the AMP will have on my original operation. We hava spent thousands of dollars improving the water, trying to cope with nature.

Thank you for this opportunity to comment, and I will be looking forward to your response to the abova questions.

Yours truly,

George H. Creel

GHC/gt

April 24, 1979

District Manager
Bureau of Land Management
Socorro, N.M. 87801

Dear Sir:

My name is Holm Bursum and I operate Bursum Ranch, East of Socorro. It is covered in the present Environmental Impact Statement.

Number One: In my opinion, the time necessary to prepare the EIS with the aide of maybe 100 technicians employed by the BLM to prepare the said impact statement of some 300 pages over a period of some two to three years in which EIS is prepared in a technical manner and with wordage not easily understandable by the average layman is not enough. It is further my opinion that the time for putting input in concerning this statement is certainly not near enough -- some two months to evaluate and be able to put constructive input into the hands of the BLM in the time allotted (some 50 days) falls far short of the time really required. I would say that at least a year would be necessary for enough study to be made by users of the public domain to put in constructive reasonable recommendations. A great many people feel that a monitoring of the actual operations of livestock on these public lands should be done for a period of years prior to making a determination of the carrying capacity.

WHAT IS BLM'S RESPONSE TO THIS PROPOSAL?

Item Number Two: Very little space was devoted in the EIS regarding the method and validity of the appraisal of the public lands in question as to what the carrying capacity might be. According to the figures used in the statement, the appraisal was carried out over a two-year period. In the first place, I don't think that was a long enough period for making an accurate determination. What was the condition of the range at the beginning period of appraisal and the finishing period of appraisal? What

were the weather conditions? What was the range condition? Was it during a drought period or was it done during a period of above-average rainfall in which the rains might have been better than normal? In the range management field meeting of the BLM held at Roswell, New Mexico, August 5 through 9, 1963, in which the district graziers from all the districts of New Mexico were present along with the State Administrator of the BLM and practice appraisal methods were used using the transect methods and other methods, it was finally decided since none of the personnel involved could agree on appraisals that probably much more work was needed in order to devise a method that would be semi-accurate. These recommendations were described and written up on pages 14 - 16 of that report. This includes the pace transect, notched-board transect and tape transects. Most of this experimental work was done on the Ft. Stanton Hospital pasture. Again, the question posed to the BLM is IF THESE SYSTEMS WERE WRITTEN UP AS NOT BEING ACCURATE IN 1963, WHY ARE THEY ACCURATE IN 1975 through 1977?

Item Number Three: The allotment management program which seems to be on its way out because of the fact that it has not been working with any degree of success in most cases, is something else that the EIS seems to be lacking in citing case histories of where it does work and has worked. Again, one of the prime reasons that it cannot work is because of the desire on the part of the Bureau to tie it to a calendar-type rotation or rest period. It very seldom if ever is coordinated with the amount of rainfall that falls which is the truly governing factor of forage production in a desert area such as the area that is the problem at hand in the Jornado. There are no rainfall patterns which makes an allotment management plan almost impossible to work except by the operator who is the real, true conservationist in the program of the utilization of public lands in connection with private lands and state lands in the livestock production because he has his life's work invested in the livestock operation and he must make it work and the only way it can work is with sufficient forage which accounts for the fact, as stated above, that he is the conservationist involved and without being a conservationist, he has almost a sure proposition to fail in his endeavors if he does not take care of the range. WHAT ARE THE NEW CONCEPTS OF THE BLM CONCERNING ALLOTMENT MANAGEMENT PROGRAMS?

This statement respectfully submitted and signed by

H O Bursum Jr.

Holm O. Bursum, Jr.

xc: President Jimmy Carter
Secretary of the Interior
Senator Harrison Schmitt
Senator Pete Domenici
Congressman Harold Runnels
Congressman Manuel Lujan
Congressional Delegations from: Utah, Nevada, Wyoming, Colorado and Arizona

TESTIMONY OF HATTIE LACY by KENNETH T. LACY

"Allotment 298 your survey showed that only 34 per cent of total almtd was in fair to poor condition - then why is a 49 per cent reduction mandatory? "Taken from Page A-42 East Socorro grazing environmental statement 42.

"#2 On the proposed 49 per cent range reduction why wasn't your figures of range potential on page A-58 E. S. E. S. used in deriving AUM cuts?

"#3 Considering almt 298 why wasn't the total ranch used in your analysis?

"#4 If it was your intention to use total alomt #298 in your survey was it nec. on your pt. or was your study not complete for this alomt?

"#5 As your stmt don't include all of alomt #298 how did you arrive at your AUM cuts?

"#6 The system used on E. Socorro statement was inadequate in Rio Puerco & Las Cruces districts. Why is it acceptable in E. Socorro?

"#7 Has there ever been considered voluntary range management plans set up in a stewardship program for this E. Socorro grazing environment?

"#8 There has been talk of blckng BLM & private acreage within the individual allotments so that it will be profitable to each concern - will action be tkn in the near future - if so when?

"#9 Overall in E. Socorro there has been an approximate total of 4300 head AUM prop. cuts. Has this drastic economy cut been considered in your statement?

Hattie Lacy
by Kenneth T. Lacy

P.O. Box 888
Socorro, New Mexico 87801
April 24, 1979

Bureau of Land Management
Socorro District Office
P.O. Box 1217
Socorro, New Mexico 87801

Dear Sirs:

My ranch is refered to as allotment #260 "Sierra Larga". My husband, Hunter Long, and I purchased this ranch 30 years ago. This ranch has been, and still is, my whole life and livelyhood. My husband, Hunter, is buried on this ranch - as well as four other family members, including my husband's brother and two of my sisters.

During our lifetime we have rebuilt and cased all the wells, constructed pipe lines and drinking tubs, made dirt tanks with bull dozers, and built control dams to control erosion. All of these improvements have been done on Federal land as well as on state and privately owned lands. When I personally have had many years experience on improving this ranch, why was I not consulted by the BLM on the proposed improvements? Why does the BLM assume a young man fresh out of college will have all the answers? Where were the transects made on my ranch, and what type of permanent markers were used so the trend could be checked later? What reference area was my ranch compared to, and what grazing system was used on the reference area?

I have been told the cut will be over a three-year period. Will my ranch be checked every six months to determine the trend?

Why was a one-time survey used to determine the range condition when I have been in a long drought? If my ranch was over-grazed as the BLM claims, my family and I would have had to move away a long time ago! This we have not done and will not do!

Thank you,

Virginia Long

Virginia Long

It is a pleasure for me to be here at this time, and listen in on the things that is bothering the live stock owners: whether it be cattle-sheep or horses. It even bothers this Old Indian too; Time was when I could turn my animals loose any where on the range. No one was concerned about it. No one ever came around nor send letters telling me I was over grazing or running too many cows - sheep or horses on the land which was made by the great spirit for me to use and feed my animals on that land. It was a beautiful piece of land. Lots of grass - plenty of water, plenty of rain fall.

Than one day, a white man came out of Washington D.C. saying, you have too many live stock on the range, thats bad. You must reduce your live stock, your cows your sheep, your horses. When you do that the land will become more beautiful, grass will grow as high as your hat. your cows, sheep, horses will grow bigger and fatter.

Well like a bunch of saps we believed him and did as he told us. We are still waiting for that beautiful land and grass to grow higher than our heads. Cows, sheep and horses to grow bigger and fatter. In the mean time, the grass is dying ~~up~~ out it has quit growing. The rains have ceased our cows, sheep & horses are not getting any fatter. What next? What I'm trying to say is, are we still following the same pattern which was given to us to use years ago. If we are - than I am afraid, we are headed for a heart break. Lets not let it happen. Instead let us find the answer to all this. There must be a way,

there has to be. Lets us find it. This land is ours it does not belong to any certain group of people only. Its yours and its mine, but its too bad some people seem to think they own the whole world.

Back home, in Laguna New mex. there is a ranch not a big one, Its Called WM ranch owned by the Marmon Brothers. On this ranch, we are or seem to be watched very close by the B.L.M. agents. We have been dictated to do this or dont do that. Every so often some one from the BLM office rides through the range in a pick up truck or flies over the ranch counting the animals from up above. Next thing we know, here come the letters telling us we are over stocked or over grazing in a certain area. How they get an accurate count I dont know - But it happens. They tell us we do not have enough grass for the animals to eat on. They tell us our arroyos are too deep (we only have one) and its begining to ~~back~~ fill and there is plenty of grass there & other vegetation that the Cows eat. They tell us our hills are too steep for a cow to climb. Thats where the good grass is. Gentle-men never under estimate an old cow, they can find grass and water, anytime. The B.L.M. never ~~seem~~ seem to give us credit for the forage we have other than pure grass.

I am 72 years old - and most of these years are spent in this area. I can ~~truthfully~~ truthfully say - there is never any cause

to be alarmed about the range conditions out there. I have seen it at its best and I have seen it at its worst. But there never was a time I could be afraid of seeing it dry up completely. Its true our rainfall is not as heavy as other places in the state. Neither is it as ~~frequent~~ frequent as other places. But when it does start raining We get plenty of it. Our range becomes beautiful Forage for the cattle becomes plentiful. For some reason We are never given credit for what we have They seem to forget a cow does not live on grass alone. They need Variety like humans.

I have often wondered just how many of these people from Washington or else where ~~who~~ in any Land office. Know what a land should be like before it can be used for grazing. How many of these people ever really come to get the first hand Knowledge of the range conditions, to really see the land as it is. I am afraid not too many do. It is really the man on a horse back, who ride the ranges day in and day out who honestly know the range. He doesn't ~~need~~ need a book to get what he already knows neither does he need a college degree to learn the ways of a cow. Because he was born that way. He knows, This is the man to talk to, He is the person who knows the land, the way he knows his hand. listen to him. He will tell you the truth. Maybe he cant even write — but he knows more than lot of people who claim to know it all — by looking at the pictures. Or reading a book ~~by~~ written by some professor, who never left his office.

Simon Diaz
Cubero N Mx

AMP
Petoch Wash Allotment - 0090

Fred Marmon

Our Ranch is located south of the Laguna Indian Reservation, 22 sections, 70% of this ranching unit is B.L.M. - our B.L.M. Permit is for 160 cows and 15 horses. Family members have been on this ranch since it was homesteaded in 1914. Besides my family, other Laguna Tribal members who have cattle on this unit are as follows: Morris Spira, Evangeline Rivera, Simon Siow and Lawrence Sarracino.

Upon reviewing the AMP as presented by the B.L.M. and after some research of our own on the ground, I find it difficult to understand a proposed reduction of 50% in cattle units based on the data that the B.L.M. Technicians have acquired.

Referring to the A.M.P.

Some of the areas of disagreement are as follows:

1. The A.M.P. states that there are 2181 acres of unsuitable range within the unit. In contrast, our research indicates there is about 500 acres of unsuitable land.

2. The A.M.P. suitability table states that our allotment contains 9,000 acres rated as suitable, 2,700 acres rated as potentially suitable and 2,200 acres as unsuitable.

   Our research reflects that the allotment contains 13,400 acres as suitable and 500 acres as unsuitable. We differ with the A.M.P. by 4,400 acres of usable land. That is almost 7 sections.

3. The A.M.P. states that the 1976 range survey shows that the proper grazing capacity is 80 cow units. We do not agree with this 50% reduction because we believe this 80 cow unit stocking rate is based on a gross error by the B. L. M. in usable area determination. We believe the grazing capacity should remain at the existing 175 cow units - unless more convincing evidence is produced by the B.L.M. that it should be otherwise.

4. The A.M.P. states that erosion is serious due to lack of vegetative cover over a 3,000 acre area. We agree that there is erosion, but the actual area is much less than stated above. Much of the bad erosion is occurring on B. L. M. sections. Some erosion that has occured on state and private land has been stabilized by mechanical water control structures built by cost share A.S.C. county programs.

5. The A.M.P. states that deer and cattle are competing for forage. We disagree with this statement by reason that I have been on this allotment for at least 45 years and I have yet to see a deer on the place. The forage that any deer might utilize on the allotment is very insignificant, therefore, no aums should be allocated for deer use.

6. The A.M.P. states that our livestock graze the allotment yearlong.

We disagree with this statement. Our ranch is divided into 8 pastures of varying size and shape; this gives us ample leeway in rotating our cattle from pasture to pasture as we see fit - depending on range conditions, stock water, and forage availability.

In the 1940's, this ranching unit was administrated by the Bureau of Indian Affairs. At that time the area was smaller by 1,280 acres. The Bureau of Indian Affairs Technicians by their survey determined a 220 cow unit rating at that time. Therefore, with the range in better shape now than it was in the 1940's it is difficult for us to understand a reduction of 140 cow units.

All of the above comments are the result of input from persons who have had 40 to 50 years of cattle ranching experience on this ranching unit.

The only realistic alternative I can suggest to implement an A.M.P. of this type to the satisfaction of the allottee would be to allow the allottee more flexibility and input in the way the plan should work. This should include a stipulation that the allottee would be given the authority to make certain necessary improvements on the B.L.M. Lands.

The cost of this work done by the allottee could be deducted from the annual grazing fee paid by the allottee.

Respectively Submitted,

Fred Marmon

Fred Marmon
P. O. Box 175
Laguna, New Mexico 87026

Comments addressed to the above items of disagreement are requested from the B.L.M.

BUREAU OF LAND MANAGEMENT
EAST SECOND GRAZING ENVIRONMENTAL STATEMENT:

IN RESPONSE TO THE GRAZING STATEMENT I DO NOT BELIEVE THAT ANYONE IN THE BUREAU OF LAND MANAGEMENT SYSTEM ARE QUALIFIED ENOUGH TO PUT TOGETHER AN ENVIRONMENTAL STATEMENT IN SUCH A SHORT PERIOD OF TIME THAT WILL SO DRASTICLY EFFECT SO MANY PEOPLE.

IT IS UNBELIEVABLE THAT IN THESE DAYS WITH INFLATION AND A POSSIBLE RECESSION AROUND THE CORNER THAT AN AGENCY OF THE FEDERAL GOVERNMENT WOULD WRITE A DOCUMENT THAT WOULD BRING FINANCIAL RUIN, HARDSHIPS ON FAMILIES AND COMMUNITIES, REDUCED EMPLOYMENT, A NECESSITY FOR HIGHER BEEF PRICES, A CUT IN LIVESTOCK NUMBERS WITH A RISE IN LEASE, THE DEVALUATION OF LAND USED AS COLLATERAL, INCREASED GOVERNMENT CONTROL OVER THE INDIVIDUAL IN

PRIVATE LANDS, AND NO INCENTIVE LEFT FOR THE YOUNG PEOPLE TO STAY IN THE RANCHING BUSINESS

WHY WERE ONLY A FEW SHORT PAGES WRITTEN ON SOCIO-ECONOMICS, THIS BEING WHAT WOULD EFFECT THOUSANDS OF PEOPLE? THE SAME PEOPLE WHOSE FOREFATHERS SETTLED THE WEST WHEN SOME 100 YEARS AGO, NO ONE WANTED IT. THEY FOUND A USE FOR IT - CATTLE. NOW THE RANCHER IS BEING REGULATED OUT OF BUSINESS ON THOSE LANDS.

THE RANCHER CARES AND ALWAYS HAS CARED FOR THE LAND. HE LIVES OFF IT, HE TAKES CARE OF IT AND INTURN THE LAND THATS CARE OF HIM.

HE NOT ONLY CARES FOR HIS LIVESTOCK, BUT WITH WINDMILLS, PIPELINES, DIRT TANKS FEED + MINERAL HE ALSO CARES FOR THE WILDLIFE WHICH ALSO USE THEM. I BELIEVE THERE IS AN INCREASE OF NUMBERS OF WILDLIFE OPPOSED TO A DECREASE BECAUSE OF THE RANCHER. HE HAS UNDOUBTLY IMPROVED THE LAND NO ONE WANTED BUT NOW SOME WOULD LIKE TO SEE IT TAKEN AWAY FROM HIM.

ALSO IN THE ENVIRONMENTAL STATEMENT I NOTICED VERY LITTLE ON THE PRAIRIE DOG'S EFFECT ON THE ENVIRONMENT AND RANGE GRASSES

OUR ALLOTMENT HAS APROX. 1200 ACRES OF PRAIRIE DOG INFESTATION WITH AVERAGE ADULT POPULATION OF ABOUT 8-10 DOG PER ACRE EATING APROX. 4 OZ. OF GREEN GRASS A DAY 1200 ACRES WITH 10 TO AN ACRE EQUALS 12,000 DOGS ON OUR ALLOTMENT EATING 3000 LBS. OF GRASS A DAY. WHICH IS THE EQUIVELENT OF 100 COWS AVERAGING 1000# EATING 30# OF GREEN GRASS A DAY

I AM NOT FOR TOTAL EXTINCTION OF PRAIRIE DOGS, THAT'S IMPOSSIBLE, JUST SOME CONTROL.

ALSO WHY IS THERE NO CONSIDERATION GIVEN TO AGE + CLASS OF LIVESTOCK? SURELY THE B.L.M. KNOWS THAT A YEARLING EATS LESS THAN A 1000# COW

WHY ARE THEY CONSIDERED EQUAL WHEN DETERMINING LIVESTOCK NUMBERS?

WHY ARE THERE NO LIVESTOCK SPECIALISTS EMPLOYED BY THE BLM? WHEN LIVESTOCK IS SUPPOSE TO HAVE SUCH A GREAT IMPACT ON THE ENVIRONMENT.

WHY CAN'T PRODUCTION RECORDS OF CATTLE BE USED TO SHOW THAT THE LAND IS IN GOOD SHAPE. WEANING 500# CALVES OFF 850# COWS WITH A 92% TO 95% CALF CROP PERCENTAGE AND ONLY A THREE MONTH FEEDING IS THE SIGN OF GOOD LAND. IF IT WASN'T IN GOOD SHAPE THOSE FIGURES WOULD ONLY BE A DREAM NOT A REALITY.

IN THESE DAYS OF BIG BUSINESS AND LARGE CORPORATIONS THE VANISHING FAMILY RANCHING OPERATION IS INEVATIBLE. IT IS REALLY A SAD DAY WHEN THE UNITED STATES GOVERNMENT THROUGH ITS INTANGLED BUREAUCRACY CAN CONTRIBUTE TO THE DESTRUCTION OF THIS WAY OF LIFE, A GREAT AMERICAN HERITAGE. THE AMERICAN FAMILY OPERATED RANCH

WILL MY CHILDREN, THE FOURTH GENERATION, BE ABLE TO HOLD ON TO A PIECE OF THEIR HEIRITAGE AND MAKE A LIVING IN OUR TRADITIONAL WAY? WILL I?

Wally Seis

CERRO VERDE RANCH

WALLY SEIS

655 CHERRIE CT.

BOSQUE FARMS, N.M.

87068

Director of the BLM
Environmental Impact Study

In 1876 the Centennial of the Declaration of Independence resulted in a celebration in Philadelphia, the celebration showing inventions [illegible] but little to [illegible] the West. Of America's forty million citizens most [illegible] not aware of the cattleman who had settled in the West. Old geography text books referred to the area between California and the first tier states west of the Mississippi as the "Great American Desert."

According to our forefathers the West was considered a "vast, worthless area [illegible] home of [illegible] and [illegible] [illegible] while this [illegible] year [illegible] going on the cattleman was developing this area and did find something there that was worthwhile. A hardy breed that made a living from what the elite considered useless. Now it seems conservationist want the "Great American desert" and think nothing of the families who have made their home and livelihood dependent on this land.

No site yet has been given to the benefit [illegible] cattle [illegible] replenishing the water areas, salt blocks and feed the cattle man is supplying.

Although nothing is more beautiful than a stand of tall, waving grass — so is nothing more [illegible] than grass is allowed to grow where [illegible] and [illegible] no room for new grass to [illegible] become [illegible] [illegible] and [illegible] stock both. When you decrease grazing to decrease water runoff you also decrease water supply to drinking areas which are used by wildlife as much as our stock.

As far as the impact on sightseeing I have yet to see a cow destroy any scenic quality compared to a sightseer who most delightedly throwing his trash and scattering [illegible] cans across the land. This isn't counting the motor cyclist who obviously doesn't know what a road is for.

After reading the Environmental Impact Study it is my opinion the content is not conclusive due to the lack of competency.

Jeane [illegible]
Cerro Verde Ranch

P. O. Box 388
Albuquerque, New Mex. 87103
April 16, 1979

Department of Interior
Bureau of Land Management
Socorro, New Mexico

Re: East Socorro Enviornmental Statement

Gentlemen:

With reference to the above, I would first like to make a few remarks as to the overall statement. It is inconceivable that a small team of men, unfamiliar with most of the country, could make an accurate range survey in a short time covering over one and one-half million acres, roughly 2500 square miles, and arrive at a true carrying capacity--especially when the figures arrived at are going to create economic havoc to all concerned. I firmly believe that these figures were predetermined and brought on by pressures from other enviornmental groups, since in no case that I am aware of, were actual use figures used nor were operators contacted. Justification that perhaps in twenty years enough additional forage would be available to increase the carrying capacity is little satisfaction when one is no longer in the business.

To be more specific, in the case of Cerro De Oro Ranch Unit, comprising 47,000 acres or an area of approximately 72 square miles, and which is 64% private land, a figure was determined which ended up to be around five head per section. This range was rated in 1973 at eight to nine head per section by BLM personnel in relation to an Amp, and it is better now than it was then. We have been ranching this area for over forty years and except for years of drouth, we have never run less than eight head per section. The proposed cut of 188 cattle will lower our collateral by at least $188,000., which we could neither afford nor could expenses be met with the remaining capacity.

To substantiate our contention that the range is not over-grazed, the condition of our cows and weaning weights of 500 lb. calves, with little or no supplemental feed, speaks for itself.

Re: East Socorro Enviornmental Statement

Further, to really determine carrying capacity, I feel that the type and size of livestock has a large bearing, as also does the type of terrain as in our hilly and mesa country, where most sections are close to being over 700 acres of grazing area. Also, to prove the fallacy of these studies, Vegetation Maps, Visual B, show large areas of mesquite where none exists and maps on page 2-26 on range condition classes show areas to be poor which are better than lands shown to be fair, and visa versa.

In view of the hurried manner in which all of these extremely vital decisions were made and the numerous discrepancies which are evident, I respectfully and urgently request that no action be taken until more realistic decisions can be determined.

Sincerely,

William M. Seis
Cerro de Oro Ranch

April 24, 79

The Blm has proposed 3 miles of pipeline and 3 miles of Cross fence on 9 sections. I have used this place ten years, Cattle have used about half because of no Water.

Why then Should the Blm Cut my permit by 54% When the pipeline will give full benfit of the 9 Sections? After this pipeline is in operation, there should be an Observation period of 5 years or more! If this does not improve range land, then suggest new alternatives.

There is no reason to Cross fence a place this Small. Cattle could be Controlled by Water, therefore Control over grazing.

Why should this proposed fence which will be almost impossible to Maintane

-2-

because of hills and arroyo's be built at all? It will only accomplish smaller pastures and more over grazing.

To determine sediment yield and possible erosion, What reference areas were used to Compare the East Socorro area? In the reference area, What is the Cover and texture of the Soil, depth of Soil and degree of Slope? In the East Socorro area, Was there a determination made of the normal geologic erosion?

Charles J Muney
Box 1212
Socorro, New Mexico
87801

Salado
Natural Resource Conservation District
P.O. Box 3 · Magdalena, New Mexico 87825

RESPONSE TO THE EAST SOCORRO GRAZING ENVIRONMENTAL STATEMENT

The following discussion contains questions and recommendations the district has made about the East Socorro Grazing Environmental Statement. The district hopes these comments will be listened to and incorporated into the Grazing E.S. which is currently being conducted in the Salado SWCD.

1.) The statement on page 2-28 on Range Trend is very questionable. Trend is dynamic. The fact that it has stabilized at a less than desireable condition because 68% of the range is in poor and fair condition is debatable. Many of the ranchers and other individuals involved feel an upward trend is apparent on many of the allotments.

2.) The constant predictions of vegetative responce in 20 years is also questionable. When weather patterns can be predicted accurately over a period of time it might be possible to predict the exact increase in density and cover the E.S. keeps referring to.

3.) The district questions the method used at being the best way of arriving at the proposed action. Was it the best method? If the allotment is cut another method should be used to see if the cuts are realistic. One individuals mistake could mean financial disaster for a permittee. Suggest S.C.S. safe suggested stocking rates be also used.

4.) The district also questions the equity of the cuts being proposed. Comparing allotments 263, 284, and 297 has raised questions. How was the data collectedwhich led to proposed

Salado
Natural Resource Conservation District
P.O. Box 3 · Magdalena, New Mexico 87825

action recommending the cuts? How qualified were the range conservationists collecting the data? How much experience did they have? Were the same range conservationists used through the whole E.S. process (in other words did the quality of the work have continuity to it)? Did the individuals compiling the data and writing the E.S. have a chance to see all of the allotments in the field first hand?

5.) Flexibility is controlled not by the calendar but by the climatic conditions which prevail at the time. One week on either side of a move date is not flexibility.

6.) While collecting data for the resource analysis the BLM employees collecting the data should be required to work with the rancher directly. He should attempt to have the rancher present to assist in the data collection whenever possible. This would help BLM-rancher relations and also inform the rancher how the trend and condition of his range is determined. The rancher should also be worked with very closely in determining any plan of operations and management which is proposed on his ranch. Before cuts are enacted every possible management alternative, such as fencing, and livestock water development, should be considered in order to open new or lightly used country. This would reduce the cuts and detrimental economic effect they would have on both the rancher and the community.

7.) Improvements should be made and systems started before cuts can accurately be determined. This would probably take a minimum of 5 years. Cutting numbers of a system will often prevent a grazing

Salado
Natural Resource Conservation District

P.O. Box 3 · Magdalena, New Mexico 87825

system from working rather than help it.

8.) If an advisory board is not in operation at the present time one should be established. Individuals included on it should be local ranchers, range specialists from New Mexico State Univ. the U.S. Fish & Wildlife Service, Game & Fish Dept. representative, Soil & Water Conservation District Bd. member, etc. The advisory board should review on the ground all allotments where cuts are proposed and make recommendations.

Sincerely,

SALADO SWCD

ALBUQUERQUE HEARING

Index No.	Speaker
1	David Lange
2	Frank Herrera
3	Mack Brown

Index No.	Comment	Response
1.	"In reviewing the DES, I note some misinterpretations of some of the literature. In one case, this is in Table A-15, where a comparison is made between reduction of grazing from moderate to light use. And the first reference there, from Cook and Stoddart, the values given are reported as percent ground cover and this is indicated that the ground cover decreased when grazing was reduced. If you look in the original literature, you will find that what is actually reported is a reduction in ground cover value in terms of percent. So actually you are exactly backwards of what is reported in the literature review."	See Response 41-4.
	"Now, I also wonder about interpreting some of the data in some of these tables in terms of which, say, the percent ground cover is divided up into various plant species and then you sort of average all of that data together and how really correct that is in trying to interpret a lot of this. I don't know what a good way is to interpret a lot of that data and I admit that it must be a real problem in trying to do that, trying to understand what the various specs are, say, in a reduction in grazing.	This was the best method to use in interpreting the literature.

Index No.	Comment	Response
3.	"I further refer you to Chapter 4 of this study whereby a team of professionals from the BLM Office in Socorro, with expertise in many fields, after a 3-day training period in Albuquerque could compile such a detailed report without consulting other governmental agencies, such as the National Wildlife Refuge Agency which has control of the Sevilleta Grant which is a wilderness area of approximately 225,000 acres and come up with a zero deer population as shown on Page 2-99, Map 2-7."	Deer distribution and numbers were taken from the New Mexico Department of Game and Fish Comprehensive Plan, Part 2. Also see p. 4-2.
	"I offer my expertise, based on four years of living on Ladron Mountain within a few feet of the National Wildlife Refuge and bordering this wilderness area for approximately five miles, that 90 percent of the deer population on Ladron Mountain, live, breed, browse and water in the wildlife refuge. By constantly watching the movement and migration of this deer herd, which is far less than estimated by the BLM, I challenge the BLM to prove their so-called statistics."	See first response for Index speaker No. 3.

Index No.	Comment	Response
	"My questions is, how does an AMP operator accrue wildlife AUMs under the present grazing use? It appears that with the stroke of a pen by a BLM employee, certain AMP operators have acquired wildlife AUMs and others have not.	In the past some allotments did not have an allowance for big game. Based on the New Mexico Dept. of Game and Fish and BLM information, deduction of AUMs for deer and antelope were calculated for the proposed grazing use.
	"Next, for the past several years, Ladron Mountain has been considered as a potential wilderness area. I refer you to Table 3, p. A-26, Planning System Interrelationships, whereby a proposed range development within this area would be eliminated or delayed pending the completion of the wilderness study in Fiscal Year '80. Now, just last month, with much publicity and fanfare, the Wilderness Study Group stated they had dropped all plans to incorporate Ladron Mountain into a wilderness area. This now clears the way for BLM to reconsider and change all the data pertaining to range development for this area. It was being held in a de facto status pending the wilderness study and no proposals were considered through Fiscal Year '84.	The Wilderness Study Group mentioned apparently has nothing to do with BLM. The BLM plans to recommend the Ladron Mountain area for intensive wilderness inventory.

APPENDICES

A

APPENDIX I

PROPOSED ACTION AND ALTERNATIVES

TABLE A-1

PROPOSED ACTION

Allotment and Acreage	PRESENT GRAZING USE: Public Land AUMs% 1/	PRESENT GRAZING USE: Livestock AUMs	PRESENT GRAZING USE: Wildlife AUMs	PROPOSED GRAZING USE /5: Public Land AUMs% 1/	PROPOSED GRAZING USE /5: Livestock AUMs	PROPOSED GRAZING USE /5: Wildlife AUMs	Proposed Change in Livestock AUMs %	Type of Grazing System and Number of Pastures 2/
AMPs								
002 P Mesa Carrizo								
14,572 Ac. PL	33	1,776	36	29	753			
33,951 Ac. O		3,576	0		1,879			
48,523 Ac.		5,352	36		2,632	79	-51	RR-3
006 P Ojo Saladito								
11,250 Ac. PL	87	1,441	36	84	1,235			
2,481 Ac. O		207	0		243			
13,731 Ac.		1,648	36		1,478	34	-10	RR-4
012 P Riley Community								
1,794 Ac. PL	100	96	0	100	65			
935 Ac. O		0	0		0			
2,729 Ac.		96	0		65	5	-22	RD-2
016 P Puertecito & Barranco								
12,512 Ac. PL	53	1,260	0	47	1,060			
13,325 Ac. O		1,098	0		1,194			
25,837 Ac.		2,358	0		2,254	48	- 4	RB-4
036 E Rio Puerco /7								
11,959 Ac. PL	98	1,177	0	98	1,177			
137 Ac. O		23	0		23			
12,096 Ac.		1,200	0		1,200	7	0	RR-3
037 P Chavez Community								
11,873 Ac. PL	85	1,950	24	84	1,132			
2,203 Ac. O		342	0		220			
14,076 Ac.		2,292	24		1,352	62	-41	RR-3
052 P Cerro Colorado								
1,376 Ac. PL	67	144	12	55	43			
720 Ac. O		72	12		35			
2,096 Ac.		216	24		78	19	-64	CS-1
058 E Canon Alamito								
3,619 Ac. PL	83	624	12	77	413			
958 Ac. O		132	0		121			
4,577 Ac.		756	12		534	14	-29	RD-2
059 E La Jencia								
18,028 Ac. PL	62	1,992	144	60	1,064			
9,662 Ac. O		1,236	0		698			
27,690 Ac.		3,228	144		1,762	110	-45	RR-6
065 E Arroyo Lucero								
11,919 Ac. PL	38	1,380	24	35	995			
21,173 Ac. O		2,256	0		1,836			
33,092 Ac.		3,636	24		2,831	65	-22	RS-4
077 E Ladron Peak								
4,276 Ac. PL	76	420	0	57	108			
2,297 Ac. O		132	0		83			
6,573 Ac.		552	0		191	46	-65	RR-2
081 E Lopez Community /7								
5,869 Ac. PL	95	900	67	95	900			
320 Ac. O		48	0		48			
6,189 Ac.		948	67		948	14	0	RR-3
083 P Big Sandy Wash								
634 Ac. PL	100	72	0	100	64			
0 Ac. O		0	0		0			
634 Ac.		72	0		64	2	-11	CS-1
086 P West Ladron /7								
23,918 Ac. PL	83	2,340	132	83	2,340			
3,964 Ac. O		492	0		492			
27,882 Ac.		2,832	132		2,832	84	0	RR-4
089 P Tsidu-Weza								
321 Ac. PL	50	48	0	49	21			
323 Ac. O		48	0		22			
644 Ac.		96	0		43	2	-55	CS-1
090 P Petoch Wash								
9,189 Ac. PL	68	1,428	24	68	656			
4,710 Ac. O		672	0		303			
13,899 Ac.		2,100	24		959	26	-54	RR-3

Allotment and Acreage	PRESENT GRAZING USE Public Land AUMs% 1/	Livestock AUMs	Wildlife AUMs	PROPOSED GRAZING USE /5 Public Land AUMs% 1/	Livestock AUMs	Wildlife AUMs	Proposed Change in Livestock AUMs %	Type of Grazing System and Number of Pastures 2/
AMPs (cont.)								
091 E Canada Colorado								
7,394 Ac. PL	98	720	0	99	474			
80 Ac. O		12	0		4			
7,474 Ac.		732	0		478	12	-35	RR-5
114 P Cerro del Oro								
16,919 Ac. PL	38	2,597	12	36	1,654			
29,654 Ac. O		4,302	0		2,986			
46,573 Ac.		6,899	12		4,640	178	-33	R8-5
121 E Rio Salado West								
7,531 Ac. PL	87	909	36	83	700			
2,177 Ac. O		123	0		148			
9,708 Ac.		1,032	36		848	19	-18	RD-2
122 E Abeytas								
2,800 Ac. PL	48	348	12	59	184			
2,617 Ac. O		372	0		126			
5,417 Ac.		720	12		310	2	-57	DR-2
129 E Arroyo Colorado								
34,550 Ac. PL	50	4,056	48	45	2,861			
37,795 Ac. O		4,109	0		3,479			
72,345 Ac.		8,165	48		6,340	166	-22	RR-5
131 P Los Valles								
3,379 Ac. PL	31	480	12	28	231			
7,561 Ac. O		1,080	0		583			
10,940 Ac.		1,560	12		814	29	-48	RR-3
152 P Cerro Verde								
11,511 Ac. PL	31	1,121	72	36	1,028			
20,567 Ac. O		2,475	0		1,828			
32,078 Ac.		3,596	72		2,856	60	-21	R8-4
250 P Milligan Gulch								
12,949 Ac. PL	67	711	12	45	230			
1,088 Ac. BR	18	192	0	37	192			
3,933 Ac. O		165	0		93			
17,970 Ac.		1,068	12		515	60	-52	RR-4
251 P Harless								
7,430 Ac. PL	41	1,428	0	41	941			
9,766 Ac. O		2,040	0		1,354			
17,196 Ac.		3,468	0		2,295	86	-34	RR-3
252 P Fernandez-Maestas /2								
17,640 Ac. PL	83	1,973	48	83	1,391			
3,645 Ac. O		404	7		293			RR-2
21,285 Ac.		2,377	55		1,684	74	-29	RD-3
253 E Vigil Ind.								
3,111 Ac. PL	100	288	12	100	204			
6 Ac. O		0	0		0			
3,117 Ac.		288	12		204	22	-29	DR-2
254 E Bordo Atravesado /3								
20,888 Ac. PL	83	2,712	0	75	1,320		384	
4,275 Ac. O		564	0		444		0	
25,163 Ac.		3,276	0		1,764	91	384/4 -46	RD-3
255 E Bosquecito								
4,723 Ac. PL	81	312	0	85	240			
1,404 Ac. O		72	0		44			
6,127 Ac.		384	0		284	19	-26	RD-2
256 E Llano								
12,682 Ac. PL	81	1,630	145	83	1,230			
3,105 Ac. O		374	0		244			
15,787 Ac.		2,004	145		1,474	46	-26	RR-3
258 P Ojo De Amado								
10,916 Ac. PL	66	736	8	84	815			
1,955 Ac. O		380	0		150			
12,871 Ac.		1,116	8		965	36	-14	RS-2

Allotment and Acreage	PRESENT GRAZING USE Public Land AUMs% 1/	Livestock AUMs	Wildlife AUMs	PROPOSED GRAZING USE /5 Public Land AUMs% 1/	Livestock AUMs	Wildlife AUMs	Proposed Change in Livestock AUMs %	Type of Grazing System and Number of Pastures 2/
AMPs (cont.)								
260 P Sierra Larga								
12,471 Ac. PL	63	2,118	36	61	1,017			
5,924 Ac. O		1,242	0		661			
18,395 Ac.		3,360	36		1,678	82	-50	RR-4
261 E Sheep Canyon /7								
19,196 Ac. PL	51	1,382	0	51	1,382			
5,519 Ac. BR	30	804	0	30	804			
5,403 Ac. O		519	0		519			
30,118 Ac.		2,705	0		2,705	79	0	RR-8
262 P Las Canas								
12,311 Ac. PL	53	1,558	0	49	1,037			
11,088 Ac. O		1,382	0		1,068			
23,399 Ac.		2,940	0		2,105	67	-28	RR-3
263 P Black Mesa								
13,654 Ac. PL	70	1,446	0	56	1,072			
7,946 Ac. O		620	0		821			
21,600 Ac.		2,066	0		1,893	86	- 9	RD-3
264 P Armijo Community								
8,559 Ac. PL	80	976	9	72	821			
2,081 Ac. O		248	0		325			
10,640 Ac.		1,224	9		1,146	38	- 6	RD-3
266 P Coyote Spring								
11,359 Ac. PL	86	1,512	24	83	1,059			
2,158 Ac. O		252	0		223			
13,517 Ac.		1,764	24		1,282	55	-27	RR-4
268 P Torreon								
26,367 Ac. PL	73	4,029	60	76	1,928			
9,528 Ac. O		1,491	0		601			
35,895 Ac.		5,520	60		2,529	209	-54	RR-4
271 P Mesa Redonda								
11,392 Ac. PL	58	2,290	21	54	1,510			
8,763 Ac. O		1,658	18		1,306			
20,155 Ac.		3,948	39		2,816	106	-29	RR-4
272 P San Pasqual River /2								
13,016 Ac. PL	45	1,836	0	46	1,922			
6,406 Ac. BR	44	1,800	0	43	1,800			
3,200 Ac. O		459	0		484			RR-3
22,622 Ac.		4,095	0		4,206	53	+ 3	RD-2
275 P Adobe, Hansenburg, Padilla /2								
31,921 Ac. PL	42	5,160	168	40	3,035			RB-3
41,303 Ac. O		7,224	132		4,614			RR-2
73,224 Ac.		12,384	300		7,649	470	-38	RD-3
276 P C. A. Bar								
2,360 Ac. PL	74	413	87	75	233			
680 Ac. O		144	0		77			
3,040 Ac.		557	87		310	14	-44	CS-1
277 P San Jose Canyon								
17,108 Ac. PL	49	1,105	30	37	633			
5,058 Ac. BR	47	1,056	0	49	828			
4,526 Ac. O		83	0		230			
26,692 Ac.		2,244	30		1,691	62	-25	RR-3
279 E Silver Canyon /7								
13,437 Ac. PL	53	797	0	53	797			
4,972 Ac. BR	36	540	0	36	540			
2,749 Ac. O		163	0		163			
21,158 Ac.		1,500	0		1,500	53	0	RR-9
280 P Tecolote Draw								
13,607 Ac. PL	68	2,073	68	78	1,183			
4,422 Ac. O		975	0		335			
18,029 Ac.		3,048	68		1,518	60	-50	RR-4
283 E Blackington Mountain								
16,309 Ac. PL	74	2,176	0	63	1,098			
6,551 Ac. O		765	0		642			
22,860 Ac.		2,941	0		1,740	60	-41	RR-3

Allotment and Acreage	Present Grazing Use: Public Land AUMs% 1/	Present Grazing Use: Livestock AUMs	Present Grazing Use: Wildlife AUMs	Proposed Grazing Use /5: Public Land AUMs% 1/	Proposed Grazing Use /5: Livestock AUMs	Proposed Grazing Use /5: Wildlife AUMs	Proposed Change in Livestock AUMs %	Type of Grazing System and Number of Pastures 2/
AMPs (cont.)								
284 P Mesa Canyon Well								
8,740 Ac. PL	72	1,440	0	74	776			
2,922 Ac. O		552	0		274			
11,662 Ac.		1,992	0		1,050	62	-47	RR-4
285 P Sand Mountain								
21,670 Ac. PL	78	1,910	24	74	1,643			
6,205 Ac. O		539	0		583			
27,875 Ac.		2,449	24		2,226	91	- 9	RD-2
287 E Gabaldon Ind.								
4,314 Ac. PL	85	264	0	89	167			
800 Ac. O		48	0		19			
5,114 Ac.		312	0		186	14	-40	RS-2
288 E Rio Grande								
4,506 Ac. PL	39	312	0	89	214			
9 Ac. BR		0	0		0			
787 Ac. O		492	0		27			
5,302 Ac.		804	0		241	14	-70	RS-2
289 E Jornada Community /7								
8,077 Ac. PL	81	1,340	60	81	1,340			
2,593 Ac. O		280	0		280			
10,670 Ac.		1,620	60		1,620	46	0	RR-3
290 P Rock Springs Canyon								
7,585 Ac. PL	61	1,344	2	59	1,347			
5,141 Ac. O		864	0		940			
12,726 Ac.		2,208	2		2,287	122	+ 4	RD-3
291 P Prairie Spring								
9,666 Ac. PL	90	1,536	0	91	1,088			
960 Ac. O		180	0		111			
10,626 Ac.		1,716	0		1,199	36	-30	RR-3
293 P Malpais								
37,425 Ac. PL	87	5,450	111	87	5,287			
5,476 Ac. O		814	0		819			
42,901 Ac.		6,264	111		6,106	144	-3	RR-5
294 P Nogal Canyon								
4,473 Ac. PL	46	586	0	21	286			
7,058 Ac. O		688	0		1,046			
11,531 Ac.		1,274	0		1,332	77	+ 5	DR-3
295 P Antelope Well								
8,636 Ac. PL	37	996	0	36	448			
12,529 Ac. O		1,724	0		782			
21,165 Ac.		2,720	0		1,230	91	-55	CS-2
297 E Puertecito del Lemitar								
14,485 Ac. PL	80	1,233	0	54	242			
5,511 Ac. O		308	0		210			
19,996 Ac.		1,541	0		452	38	-71	RR-3
298 P Belcher Corn								
2,876 Ac. PL	40	636	12	39	314			
4,640 Ac. O		936	0		487			
7,516 Ac.		1,572	12		801	29	-49	RR-4
299 P Pequeno								
11,342 Ac. PL	88	423	0	89	367			
1,592 Ac. O		58	0		46			
12,934 Ac.		481	0		413	55	-14	RS-2
300 E Lucero Ind. /7								
1,579 Ac. PL	44	318	0	44	318			
1,920 Ac. O		402	0		402			
3,499 Ac.		720	0		720	14	0	RR-4
301 P Bennett-Wilson								
17,707 Ac. PL	51	3,120	11	50	1,793			
13,996 Ac. O		3,009	0		1,766			
31,703 Ac.		6,129	11		3,559	142	-42	RR-3
303 P Carthage								
707 Ac. PL	63	76	0	100	78			
Exchange of Use		44	0		0			
707 Ac.		120	0		78	2	-35	DR-2

TABLE A-1 (continued)

PROPOSED ACTION

Allotment and Acreage	PRESENT GRAZING USE: Public Land AUMs% 1/	PRESENT GRAZING USE: Livestock AUMs	PRESENT GRAZING USE: Wildlife AUMs	PROPOSED GRAZING USE /5: Public Land AUMs% 1/	PROPOSED GRAZING USE /5: Livestock AUMs	PROPOSED GRAZING USE /5: Wildlife AUMs	Proposed Change in Livestock AUMs %	Type of Grazing System and Number of Pastures 2/
AMPs (cont.)								
306 P Veranito								
5,131 Ac. PL	84	444	0	75	183			
1,029 Ac. O		84	0		61			
6,160 Ac.		528	0		244	17	-54	DR-2
308 P Padilla Community								
4,836 Ac. PL	63	289	0	88	142			
691 Ac. O		167	0		19			
5,527 Ac.		456	0		161	22	-65	RS-2
312 E La Arenosa								
9,403 Ac. PL	99	852	0	99	335			
47 Ac. O		12	0		2			
9,450 Ac.		864	0		337	26	-61	RR-3
315 P Polvadera Community								
3,507 Ac. PL	92	110	0	100	68			
821 Ac. O		9	0		0			
4,328 Ac.		119	0		68	7	-43	CS-1
317 E San Pedro								
3,211 Ac. PL	67	285	0	91	95			
534 Ac. O		140	0		9			
3,745 Ac.		425	0		104	36	-76	DR-3
318 E Pueblito Community								
5,165 Ac. PL	96	370	8	99	290			
163 Ac. O		14	0		2			
5,328 Ac.		384	8		292	14	-24	RS-2
321 P Puertecito Gap								
5,242 Ac. PL	41	659	0	33	278			
6,331 Ac. O		949	0		565			
11,573 Ac.		1,608	0		843	50	-48	RS-2
322 P Parida								
10,843 Ac. PL	56	1,258	24	55	1,044			
6,723 Ac. O		986	0		856			
17,566 Ac.		2,244	24		1,900	67	-15	RR-3
323 P Water Canyon								
7,347 Ac. PL	54	972	0	47	906			
5,970 Ac. O		828	0		1,006			
13,317 Ac.		1,800	0		1,912	118	+ 6	RS-2
325 P West Williams								
9,164 Ac. PL	66	1,710	0	60	893			
4,702 Ac. O		882	0		592			
13,866 Ac.		2,592	0		1,485	48	-43	RR-3
327 P Cedar Pass								
5,653 Ac. PL	47	1,035	0	46	445			
6,160 Ac. O		1,185	0		526			
11,813 Ac.		2,220	0		971	55	-56	RR-3
328 P Canon Quemado								
4,490 Ac. PL	74	880	0	66	664			
1,920 Ac. O		309	0		349			
6,410 Ac.		1,189	0		1,013	22	-15	RD-3
330 P East Williams								
3,112 Ac. PL	38	468	0	37	349			
5,012 Ac. O		768	0		591			
8,124 Ac.		1,236	0		940	43	-24	RD-2
347 P Blue Springs								
470 Ac. PL	100	84	0	76	13			
114 Ac. O		0	0		4			
584 Ac.		84	0		17	5	-80	CS-1
348 P Cerro Montoso								
2,198 Ac. PL	100	407	0	92	135			
160 Ac. O		0	0		11			
2,358 Ac.		407	0		146	12	-64	RD-2

Allotment and Acreage	PRESENT GRAZING USE Public Land AUMs% 1/	Livestock AUMs	Wildlife AUMs	PROPOSED GRAZING USE /5 Public Land AUMs% 1/	Livestock AUMs	Wildlife AUMs	Proposed Change in Livestock AUMs %	Type of Grazing System and Number of Pastures 2/
AMPs (cont.)								
349 P Indian Peak								
1,311 Ac. PL	100	228	0	100	81			
4 Ac. 0		0	0		0			
1,315 Ac.		228	0		81	5	-64	CS-1
360 P Chupadera								
2,627 Ac. PL	48	299	0	56	353			
1,755 Ac. 0		325	0		275			
4,382 Ac.		624	0		628	22	0	RD-2
GRAND TOTALS								
788,097 Ac. PL	60	97,274	1,683	58	66,239	4,557	394 /3	
23,052 Ac. BR		4,392	0		4,164			
456,287 Ac. 0		61,627	169		43,701			
1,267,436 Ac.		163,293	1,852		114,104			
NON-AMPs								
017 Canon Bonito								
3,122 Ac. PL	100	408	0	100	171	5	-58	NA
113 Hidden Mountain								
290 Ac. PL	100	36	0	100	19	0	-47	NA
134 Mesa Aparejo								
1,398 Ac. PL	100	108	0	100	77	2	-29	NA
143 Commanche Arroyo								
310 Ac. PL	100	36	0	100	13	0	-64	NA
145 D-Cross Mountain								
3,942 Ac. PL	100	636	0	100	342	5	-46	NA
165 R. Lucero Ind.								
96 Ac. PL	100	12	0	100	8	0	-33	NA
267 Ball Ind.								
2,448 Ac. PL	100	420	0	100	318	10	-21	NA
281 Culbreath Ind.								
5,714 Ac. PL	100	1,185	12	100	903	38	-24	NA
282 Dean Ind.								
960 Ac. PL	100	60	0	100	39	5	-35	NA
296 Hudgins Ind.								
6,324 Ac. PL	100	741	0	100	836	26	+13	NA
310 Orndorff Ind.								
1,374 Ac. PL	100	201	0	100	146	7	-27	NA
340 Bishop Ind.								
2,085 Ac. PL	100	392	3	100	252	10	-36	NA
341 Brazil Ind.								
106 Ac. PL	100	23	0	100	11	0	-52	NA
342 Bryan Ind.								
1,654 Ac. PL	100	300	10	100	224	10	-25	NA
343 Chilton Ind.								
1,543 Ac. PL	100	267	0	100	144	10	-46	NA
345 Hatley Ind.								
1,193 Ac. PL	100	203	0	100	138	5	-32	NA
350 South Rainwater								
1,350 Ac. PL	100	238	0	100	218	7	-8	NA
351 Rienhardt Ind.								
1,580 Ac. PL	100	228	0	100	148	7	-35	NA
352 Sais Ind.								
3,798 Ac. PL	100	624	8	100	433	19	-31	NA
353 Sanchez Ind.								
1,460 Ac. PL	100	276	0	100	133	7	-52	NA

TABLE A-1 (continued)

PROPOSED ACTION

Allotment and Acreage	PRESENT GRAZING USE Public Land AUMs% 1/	Livestock AUMs	Wildlife AUMs	PROPOSED GRAZING USE /5 Public Land AUMs% 1/	Livestock AUMs	Wildlife AUMs	Proposed Change in Livestock AUMs %	Type of Grazing System and Number of Pastures 2/
NON-AMPs								
354 Spears Shipping Pasture 80 Ac. PL	100	24	0	100	0	0	-100	NA
355 Strozzi Ind. 1,715 Ac. PL	100	293	0	100	432	17	+47	NA
356 Wallace Ind. 581 Ac. PL	100	72	0	100	0	2	-100	NA
358 Creel Ind. 2,376 Ac. PL	100	370	0	100	315	7	-15	NA
361 C. A. Bar Ind. 480 Ac. PL	100	115	18	100	33	2	-71	NA
362 N. Rainwater Ind. 163 Ac. PL	100	24	0	100	8	0	-67	NA
Total 46,142		7,292	51		5,361	201		
ELIMINATION OF GRAZING								
286 Fullingim Ind. /4 376 Ac. PL	100	16	0	100	0	2	-100	NA
302 Marshall Ind. /4 375 Ac. PL	100	48	0	100	0	0	-100	NA
311 Owen Ind. /4 109 Ac. PL	100	24	0	100	0	1	-100	NA
357 San Lorenzo /4 1,127 Ac. PL	100	24	0	100	0	38	-100	NA
Total 1,987		112	0		0	41		
UNALLOTTED AREAS								
164 Rio Puerco /4 203 Ac. PL	100	0	0	100	0	3	0	NA
363 San Antonio /4 2,379 Ac. PL	100	0	0	100	0	0	0	NA
Total 2,582		0	0		0	3		
GRAND TOTALS								
838,808 Ac. PL		104,678	1,734		71,600	4,802	384	
23,052 Ac. BR		4,392	0		4,164	0	0	
456,287 Ac. O		61,627	169		43,701	0	0	
1,318,147 Ac. /6		170,697	1,903		119,465 /5	4,802	384 /4	

/1 = Livestock AUMs
/2 = The three AMPs having more than one grazing system are listed under the system with the greatest number of AUMs. Numbers following abbreviations indicate the number of pastures in the grazing system.
/3 = The Bordo Atravesado Allotment has a small band of wild horses. Based on our present estimate of 32 horses, 384 AUMs of forage would be set aside for their needs.
/4 = All forage produced on these allotments is available for wildlife use.
/5 = Livestock and wildlife AUMs for each allotment do not always add up to total range survey AUMs because of deductions for potentially suitable, unsuitable, and uncontrolled lands.
/6 = Does not include 332,067 acres of private and State land in non-AMP areas.
/7 = Proposed grazing use for these allotments was based on actual use, utilization, and trend studies rather than the range survey.

RR - Rest Rotation
CS - Continuous Seasonal
NA - Not Applicable
RD - Rotational Deferment
RS - Rotational Seasonal
RB - Scheduled Rest-Best Pasture
DR - Deferred Rotation
P - Proposed AMP
PL = Public Land
BR = Bureau of Reclamation
O = Other
E = Existing AMP

Source: Socorro District Grazing Files and Proposed AMPs

RANGE SURVEY METHODS

Range Survey Methodology

The survey procedure used to determine the grazing capacity for grazing animals in the ES Area was the Ocular Reconnaissance Forage Survey Method (BLM Manual 4412.11A) and the Step-Point Method (BLM Manual 7322.11B3d(13).

In August of 1975, BLM Socorro District employees initiated the survey of the area. The survey was completed in December of 1977.

The ocular reconnaissance forage survey consists of two major components. These are the field data collection and the analysis and compilation of the data. The steps involved in this survey are as follows:

1) Vegetative types and subtypes are delineated on aerial photos at a scale of 1:31,680 (1 inch = 2 miles). Types are delineated on the basis of density, species composition, slope, exposure, erosion, and other factors. The resulting mapped types are relatively homogenous vegetative units.

2) After a vegetative type or subtype unit is mapped, the following data is collected: plant species' composition and density, ground cover (litter, bare ground, small or large rock, vegetation), and any reductions in forage allocations needed because of slope, rockiness, lack of water, or other physical limitations to grazing an area.

The data gathering process was done utilizing the Step-Point method. This involves pacing off 100 points along a predetermined transect. A range conservationist, generally the individual who mapped the unit, selects an area that in his judgment is representative of the vegetative type or subtype. At each point along the transect he makes a reading, recording hits by a notch on the toe of his boot. At least two transects are run in each representative area. At the end of the transect the vegetative hits are tabulated. This gives the density of the type. He also tabulates the species hit, or those closest to the notch, to get species composition. See Figure A-1, p. A-10 (Record of Pace Transect) and Figure A-3, p. A-12 (Form 4412-1). These show actual data from a vegetative subtype delineated on Allotment 293.

Erosion conditions of each vegetative type were simultaneously collected. The method used was BLM's Phase I of the Watershed Conservation and Development System (BLM Manual 7322). Seven factors (soil movement, surface litter, surface rock, pedestalling, flow patterns, rills and gullies) were used to determine erosion condition. The observer used Form 7310-12 (Figure A-2, p. A-11) to numerically rate each of these factors. The descriptions on the form that came closest to fitting the situation of the area for each factor determined the numerical rating assigned. The total of all the numerical ratings then reflected the erosion condition class of the unit.

3) A proper use factor (PUF) was determined for each vegetative species.

A PUF represents the average weight percentage of a particular plant species, in relation to all other species, that can be safely grazed without restricting forage capacity production. Certain forage species are preferred above others; therefore, PUFs of each species vary according to grazing animals' preference, and range in value from 0 to 60. Form 4412-1, A-12, shows PUFs for species found on a transect site within Allotment 293.

4) A forage acre requirement (FAR) for the area is then determined.

The Socorro District calculated three FARs for the ES Area. This was done because of the three broad-land forms and vegetative types in the area. Six existing AMP allotments (081, 086, 261, 279, 289, and 300) were used to calculate the three FARs. Allotments 081 and 086 were used to represent the northern grassland and pinyon-juniper portion of the area. Allotments 261 and 279 were used to represent the creosote and river breaks in the central portion of the area. Allotments 289 and 300 were used to represent the southern grassland and upland pinyon-juniper areas. The FARs used were 0.32, 0.22, and 0.25, respectively, for each area discussed above. The formula A/B = C was used where A = number of forage acres; B = actual use; and C = forage acre requirement. The specific data and calculations can be reviewed in the files at the

BLM Socorro District Office.

5) The following calculations were performed for each vegetative type or subtype, Vegetative subtype number HT-40, as shown on Form 4412-1 (Figure A-3, p. A-12) was used in the following example.

Proper Use Factor (PUF) x Percent Composition = Average PUF

Total Average PUFs (.395) x Average Density (.13) = Forage Acre Factor (.051)

Forage Acre Factor (.051) x Percent of Area Utilizable (100) = Net Forage Acre Factor (.051)

Forage Acre Requirement (.25) ÷ Net Forage Acre (.051) Factor = Acres/AUM (4.9)

Vegetative Type or Subtype Area (Acres) (1,256.92) ÷ Acres/AUM (4.9) = Total AUMs for vegetative subtype (256.5)

The total AUMs for each vegetative type or subtype within the allotment are then totaled to determine the total AUMs for the allotment. The summary of range survey (Figure A-4, p. A-13) shows by land ownership for Allotment 293 total AUMs by transect for all transects in the allotment. The proposed grazing use shown on Table A-1, p. A-4 for Allotment 293 is the amount of forage allocated to livestock after allocations were made for wildlife and deductions were made for suitability.

Determination of Rangeland Suitability for Livestock Grazing

All rangeland in the ES Area was classified as to its suitability to support livestock grazing use.

The criteria used in suitability determinations for each vegetative type or subtype were: 1) distance from water; 2) slope or other physical barriers; 3) forage production; and 4) future and present erosion condition (Figure A-5, p. A-14). Each of the criteria is evaluated independently or in various combinations to arrive at one of three classes - suitable, potentially suitable, or unsuitable.

The three suitability classes are defined as follows:

Suitable ranges are areas which can be grazed by livestock without damage to the soil and vegetative resources.

Potentially suitable ranges are areas not currently suitable for livestock grazing because of 1) erosion conditions, 2) low production of perennial forage, 3) inaccessibility to livestock, and/or 4) lack of water for proper utilization by livestock. These areas may be made suitable by treatment, natural improvement, or development of stock trails or water. The assignment of forage for livestock would not be made until the area becomes suitable for grazing.

Unsuitable ranges are areas which are neither currently nor potentially suitable for livestock grazing because of: 1) extreme steepness of slope or other physical barriers; 2) erosion or inherent erosiveness of the soil which cannot be corrected through treatment or management; and 3) low production of perennial forage with little or no potential to improve through either treatment or management.

Figure A-5, p. A-14, Range Suitability Standards key, was used in determining range suitability classification. Vegetative subtype number HT-40 (Figure A-3, p. A-12) was classified as suitable for livestock grazing. The type is on a less than 5-percent slope; current production of usable perennial forage is 4.9 acres/AUM; the present soil surface factor is 27 (Figure A-2, p. A-11); and the type is within four miles of reliable water.

RECORD OF PACE TRANSECT - Figure A-1

(1) Transect No. HT-40	(2) Allotment 293	(3) District 02	
Date 10/10/75	(5) Examiner	(6) Veg. Sub. Type Desert Shrub	(7) % Veg. Sub. Type
(8) Exposure West	Effective Root Depth	(10) ¼"=4" Soil Texture	(11) 4"+
(12) SSF	(13) % Slope	(14) Primary Treatment	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Gusa	Spco	Spfl	Gusa	Spfl	Spco	Gusa	Gusa	Gusa	Spco	Spco	Boer	Spco	Spfl	Spfl	Spfl	Spfl	Hija	Hija	Eptr	Spfl	Spco	Hija	Spfl	Spfl
S	S	S	S	S	S	S	X	S	S	S	S	S	S	S	L	S	S	S	S	S	S	S	S	L
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Spfl	Hija	Spfl	Mupo	Spfl	Gusa	Hija	Boer	Spfl	Spco	Spfl	Spco	Spfl	Spfl	Boer	Spco	Spfl	Spco	Spfl	Spco	Spfl	Spfl	Yucc	Eptr	Hija
S	S	S	L	S	S	S	S	S	S	S	S	S	S	X	L	S	S	S	X	S	L	X	X	S
51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Spfl	Spfl	Hija	Arfi	Yucc	Gusa	Spfl	Spfl	Gusa	Eptr	Spco	Arfi	Spfl	Arfi	Hija	Spfl	Spfl	Yucc	Spco	Spfl	Gusa	Yucc	Hija	Spfl	Spco
S	S	L	X	X	S	S	S	S	S	S	L	S	S	S	S	S	L	S	S	S	X	S	S	S
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Boer	Spfl	Hode	Eptr	Arfi	Spfl	Arfi	Spfl	Yucc	Boer	Spfl	Boer	Hija	Boer	Arfi	Arfi	Spfl	Spfl	Spfl	Hija	Hija	Spco	Boer	Spfl	Spco
S	S	S	X	X	S	L	S	X	S	S	L	L	S	X	L	S	S	S	S	S	S	X	S	S

List usable forage hits in upper half of block using four letter plant symbol. (L) Litter; (S) Bare Ground; (SR) Rock < 2" Diameter; (A) Annual Plant; (LR) Large Rock > 2" Diameter. List all non-usable vegetation by symbol in the bottom half of blocks.

B SUMMARY OF PART A   Density = 13%

	No. of Hits
Forage (Upper Half of Block)	8
Vegetation (Lower Half of Block)	12
(15) + (16) = Total Vegetation	37
Litter	16
Bare Ground	1
Small Rock	1
Large Rock	9

C LIST OF USABLE FORAGE

(22) Plant Name		(23) Symbol	(24) Key Forage Plant	(25) No. of Hits	(26) Comp. %
Boer	Arfi	7			
Hija	Yucc	5			
Spfl	Eptr	4			
Spco					
Mupo					
Hode					
Gusa					

*Vegetative codes are explained in Appendix 2, Table A-4, p. A-36

L= Litter
S= Soil
X= Vegetative Hit of Species

D WILDLIFE

	No.
Pellet Groups (5' x 135 Paces) Total	
Elk	
Deer	
Antelope	
Game Birds Sighted No. & Species	
Ocular Estimate of Browse Species	
Species	%

E TREND

	Values	
(35) Vigor		
(36) Reproduction		
(37) Total		
Apparent Trend		
(39) 0 to 33 Improving		
(40) 34 to 66 Static		
(41) 67 to 100 Declining		

(42)

PHOTO TAKEN

☐ YES ☐ NO

SIZE PLOT

☐ 3x3 ☐ 5x5

Figure A-2

Form 7310–12
(May 1973)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

By

Date 10-10-75

Location Allotment 293

Treatment affecting the SSF

DETERMINATION OF EROSION CONDITION CLASS

SOIL SURFACE FACTORS (SSF)

SOIL MOVEMENT *	No visual evidence of movement 0 1 2 3	Some movement of soil particles 4 5	Moderate movement of soil is visible and recent. Slight terracing generally less than 1" in height. 6 7 8	Occurs with each event. Soil and debris deposited against minor obstructions. 9 10 11	Subsoil exposed over much of area, may have embryonic dunes and wind scoured depressions 12 13 14
SURFACE LITTER *	Accumulating in place 0 1 2 3	May show slight movement 4 5 6	Moderate movement is apparent, deposited against obstacles 7 8	Extreme movement apparent, large and numerous deposits against obstacles 9 10 11	Very little remaining *(use care on low productive sites)* 12 13 14
SURFACE ROCK *	If present, the distribution of fragments show no movement caused by wind or water 0 1 2	If present, coarse fragments have a truncated appearance or spotty distribution caused by wind or water 3 4 5	If present, fragments have a poorly developed distribution pattern caused by wind or water 6 7 8	If present, surface rock or fragments exhibit same movement and accumulation of smaller fragments behind obstacles 9 10 11	If present, surface rock or fragments are dissected by rills and gullies or are already washed away 12 13 14
PEDESTALLING *	No visual evidence of pedestalling 0 1 2 3	Slight pedestalling, in flow patterns 4 5 6	Small rock and plant pedestals occurring in flow patterns 7 8 9	Rocks and plants on pedestals generally evident, plant roots exposed 10 11	Most rocks and plants pedestalled and roots exposed 12 13 14
FLOW PATTERNS *	No visual evidence of flow patterns 0 1 2 3	Deposition of particles may be in evidence 4 5 6	Well defined, small, and few with intermittent deposits 7 8 9	Flow patterns contain silt and sand deposits and alluvial fans 10 11 12	Flow patterns are numerous and readily noticeable. May have large barren fan deposits. 13 14 15
RILLS	No visual evidence of rills 0 1 2 3	Some rills in evidence at infrequent intervals over 10' 4 5 6	Rills ½" to 6" deep occur in exposed places at approximately 10' intervals 7 8 9	Rills ½" to 6" deep occur in exposed area at intervals of 5 to 10' 10 11 12	May be present at 3" to 6" deep at intervals less than 5' 13 14
GULLIES	May be present in stable condition. Vegetation on channel bed and side slopes 0 1 2 3	A few gullies in evidence which show little bed or slope erosion. Some vegetation is present on slopes. 4 5 6	Gullies are well developed with active erosion along less than 10% of their length. Some vegetation may be present. 7 8 9	Gullies are numerous and well developed with active erosion along 10 to 50% of their lengths or a few well developed gullies with active erosion along more than 50% of their length 10 11 12	Sharply incised gullies cover most of the area and over 50% are actively eroding 13 14 15

SITUATION	TOTAL				
Slight	27	$\frac{19}{71} \times 100 = 27$			

Erosion Condition Classes: Stable 0–20; Slight 21–40; Moderate 41–60; Critical 61–80; Severe 81–100

(Instructions on reverse)

Form 4412–1
(November 1970)

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORAGE SURVEY TYPE WRITEUP
(OCULAR RECONNAISSANCE METHOD)

Figure A-3

Writeup No.	HT-40
Date	10-10-75
Aerial Photo No.	

Examiner	KIND OF GRAZING ANIMAL *	SEASON OF USE	SECTIONS	TWP.	RGE.	MER.
Type 16-Yucc-Spfl-Spco	Cattle, Deer,	YL				
Ac/AUM 4.9	Antelope					

	SPECIES	TOTAL ALLOWABLE PUF	% COMPOSITION	CATTLE PUF	COMP. X C PUF	SHEEP PUF	COMP. X S PUF	DEER PUF	COMP. X D PUF	PUF	COMP. X __ PUF
GRASSES	Spfl	50	37		.185						
	Hija	45	12		.054						
	Boer	55	8		.044						
	Spco	50	16		.080						
	Spgi	--	T		--						
	Mupo	45	1		.005						
	Trpu	--	T		--						
	Aris	--	T		--						
	SUBTOTAL		74								
FORBS	Hode	30	1		.003						
	SUBTOTAL		1								
SHRUBS	Yucc	15	5		.008						
	Arfi	10	7		.007						
	Gusa	1	9		.001						
	Eptr	20	4		.008						
	SUBTOTAL		25								
	TOTALS		100		.395						

*Vegetative codes are explained in Appendix 2, Table A-4, p. A-36

Av C PUF .395 × Av Den 13 = FAF .051 × 100% Util = Net FAF .051 ; FAR .25 ÷ Net FAF .051 = 4.9 Ac/AUM

Av S PUF ____ × Av Den ____ = FAF ____ × ____% Util = Net FAF ____ ; FAR ____ ÷ Net FAF ____ = ____ Ac/AUM

Av D PUF ____ × Av Den ____ = FAF ____ × ____% Util = Net FAF ____ ; FAR ____ ÷ Net FAF ____ = ____ Ac/AUM

Av PUF ____ × Av Den ____ = FAF ____ × ____% Util = Net FAF ____ ; FAR ____ ÷ Net FAF ____ = ____ Ac/AUM

Total Net FAF ____ ; FAR ____ ÷ Net FAF ____ = ____ Ac/AUM

* Livestock and major game species. *(Other game species making inappreciable use are:*

SUMMARY OF RANGE SURVEY BY ALLOTMENT

Figure A-4

ALLOTMENT NO: 293 ALLOTMENT NAME: Malpais DATE: 12/1/77

Writeup No.	Veg. Type	Acre/ AUM	Federal Range Acres	Federal Range AUMs	State Acres	State AUMs	Patented Acres	Patented AUMs	Other Federal Uncontrolled Acres	Other Federal Uncontrolled AUMs	Total Acres	Total AUMs
BH-35	17	9.6	378	39.38					8	0.83	386	40.21
BH-36	4	4.4	2,086.56	474.22					72	16.36	2,158.56	490.58
BH-38	1	6.4	400	62.5	55	8.59	29	4.53			484	75.62
BH-40	1	3.7	281	75.95	130	35.14					411	111.09
BH-41	1	9.6	119	12.39			25	2.6			144	14.99
BH-42	1	7.6	1,774.28	233.46	32	4.21	31	4.08			1,837.28	241.75
BH-67	1	6.3	212	33.65							212	33.65
BH-80	4	5.7	8	1.4							8	1.4
BH-82	16	7.4	53	7.16							53	7.16
HT-26	4	5.2	283.25	34.47	182	35					465.25	89.47
HT-27	13	10.4	835.72	80.36							835.72	80.36
HT-28	4	4.7	963.55	205.01							963.55	205.01
HT-29	4	3.5	225	64.29	248	70.85					473	135.14
HT-30	4	14.7	678.2	46.14	71	4.83					749.2	50.97
HT-31	16	6.9	305	44.2	293	42.46					598	86.66
HT-32	4	10.4	938	90.19							938	90.19
HT-33	1	9.3	1,366	146.88							1,366	146.88
HT-34	1	5.8	29	5.0							29	5.0
HT-35	1	5.8	118	20.34	78	13.45					196	33.79
HT-36	4	4.4	4,242.57	964.22	1,187.88	269.97					5,430.45	1,234.19
HT-37	16	4.9	2,681.19	547.18	74	15.1	9	1.84			2,764.19	564.12
HT-38	4	6.6	1,555.78	235.72	640	96.97					2,195.78	332.69
HT-39	16	6.8	585	86.03							585	86.03
HT-40	16	4.9	1,233.92	251.82	23	4.69					1,256.92	256.51
LV-1	1	13.9	119	8.56			108	7.77			227	16.33
TB-1	1	3.6	163	45.28							163	45.28
TB-2	16	4.1	501	122.19	19	4.63					520	126.82
TB-3	4	4.4	795	180.68							795	180.68
TD-65	1	10.9	6,245.78	573.01	412.08	37.8	23	2.11			6,680.86	612.92
TD-66	1	11.4	8,205.68	719.79	1,710.6	150.05	15	1.32			9,931.28	871.16
Barren			44								44	
TOTAL			37,425.48	5,431.47	5,155.56	793.74	240	24.35	80	17.19	42,901.04	6,266.65

Proposed Grazing Use = Total AUMs (6,267 AUMs) - Wildlife AUMs (144 AUMs) - Uncontrolled (17 AUMs)

Proposed Grazing Use = 6,106 AUMs (Table A-1, p. A-4)

Source: Range Survey File for Allotment 293, Socorro District Office

FIGURE A-5

RANGE SUITABILITY STANDARDS

Suitability Element	Recommended	Suitability
1. Percent slope is greater than	50%	U - Inaccessible
1. Percent slope is less than	50%	
2. Current production of usable perennial forage is not sufficient to provide grazing capacity of less than	32 Ac/AUM (25 lbs/ac)	
3. Potential production (either through management or treatment) of usable perennial forage is not sufficient to provide grazing capacity of less than	32 Ac/AUM	U - Low Production
3. Potential production (either through management or treatment) of usable perennial forage is sufficient to provide grazing capacity of less than	32 Ac/AUM	
4. Present SSF is greater than	60 SSF	
5. Potential SSF is greater than	60 SSF	U - Erosion
5. Potential SSF is less than	60 SSF	
6. Potential SSF is more than	50 SSF	
7. Slope greater than	20%	U - Erosion & Slope
7. Slope less than	20%	PS - Erosion
6. Potential SSF is less than	50 SSF	To Table 1 - Erosion
4. Present SSF is less than	60 SSF	
8. Present SSF more than (less than 60)	50 SSF	
9. Potential SSF more than (less than 60)	50 SSF	
10. Slope greater than	20%	U - Erosion
10. Slope less than	20%	PS - Erosion
9. Potential SSF less than	50 SSF	To Table 1 - Erosion
8. Present SSF less than	50 SSF	To Table 1 - Low Production
2. Current production of usable perennial forage is sufficient to provide grazing capacity of less than	32 Ac/AUM	
11. Present SSF is greater than	60 SSF	
12. Potential SSF is greater than	60 SSF	U - Erosion
12. Potential SSF is less than	60 SSF	
13. Potential SSF is more than	50 SSF	
14. Slope greater than	20%	U - Erosion
14. Slope less than	20%	PS - Erosion
13. Potential SSF less than	50 SSF	To Table 1 - Erosion
11. Present SSF is less than	60 SSF	
15. Present SSF more than (less than 60)	50 SSF	
16. Potential SSF more than	50 SSF	
17. Slope greater than	20%	U
17. Slope less than	20%	PS - Erosion
16. Potential SSF less than	50 SSF	
18. Distance from reliable water is more than	4 miles	To Table 1 - Water
18. Distance from reliable water is less than	4 miles	To Table 2
15. Present SSF less than	50 SSF	
19. Distance from reliable water is more than	4 miles	To Table 1 - Water
19. Distance from reliable water is less than	4 miles	To Table 2

PS = Potentially Suitable
U = Unsuitable

TABLE 1

WATER MORE THAN 4 MILES
SUITABILITY DETERMINATIONS

Slope Percent	Distance Up Slope	Potentially Suitable	Unsuitable
0%-20%	to 4 miles	X	
	over 4 miles		X
21%-30%	to 0.6 miles	X	
	over 0.6 miles		X
31%-40%	to 0.4 miles	X	
	over 0.4 miles		X
41%-50%	to 0.3 miles	X	
	over 0.3 miles		X
51%			X

TABLE 2

WATER LESS THAN 4 MILES
SUITABILITY DETERMINATIONS

Slope Percent	Distance Up Slope	Suitable	Unsuitable
0%-20%	to 4 miles	X	
	over 4 miles		X
21%-30%	to 0.6 miles	X	
	over 0.6 miles		X
31%-40%	to 0.4 miles	X	
	over 0.4 miles		X
41%-50%	to 0.3 miles	X	
	over 0.3 miles		X
51%			X

Source: USDI - BLM Instruction Memo No. 78-134

Methodology for Determining Existing Deer and Existing and Predicted Antelope Numbers

The existing wildlife numbers were computed from maps showing deer and antelope density, habitat trend, and population trend. These maps were included in the New Mexico Department of Game and Fish (NMDG&F) Comprehensive Plan, 1978. The number of deer or antelope on an allotment was developed by multiplying the density times the number of units of area (deer were in sections, antelope in 1,000 acres) found on the allotment. Allotment 293 is located in the White Sands Herd Unit. NMDG&F estimate the deer density of this unit to be .25 deer per section and the antelope density to be 1 antelope per 1,000 acres. Allotment 293 contains 42,901 acres (67 sections). Big game numbers were computed to be:

.25 deer/section x 67 sections = 16.7 or 17 deer.

1 antelope/1,000 acres x 42,901 acres = 42.9 or 43 antelope

Once existing big game numbers were determined, NMDG&F trend data was used to determine deer and antelope numbers for 1985. NMDG&F trend data for the White Sands Herd Unit predicted deer and antelope numbers to remain stable by 1985. Therefore, for Allotment 293, 1985 big game numbers were computed to be:

No change in deer numbers, or 17 deer

No change in antelope numbers, or 43 antelope

Total big game 60

For the Proposed Action, forage was assigned to wildlife on each allotment according to the big game numbers predicted for 1985. This was done because the proposed livestock reductions would not be completed until 1984; NMDG&F trend data was based on 1985 predictions; so rather than re-allocate forage in 1985 for the predicted increases in big game, forage would be reserved during the reduction period and the estimated deer and antelope would have their forage requirements satisfied.

A conversion factor of five deer and/or antelope to one cow was used to determine AUMs needed on each allotment. The number of AUMs to be allocated for big game on Allotment 293 was computed as follows;

Total deer and antelope (60) ÷ Conversion factor (5) = Animal Units (12)

Animal Units (12) x Months (12) = AUMs (144)

The wildlife (big game) AUMs allocated for Allotment 293 (144 AUMs) are shown on Table A-1, p. A-4.

The change in antelope and deer numbers from the Proposed Action was predicted by the BLM Wildlife Biologist. Deer numbers in the ES Area did not appear to be impacted significantly by livestock grazing and were not predicted to increase. Antelope numbers were predicted to increase with the Proposed Action. This increase was determined through the use of a mathematical formula (shown below) that included the number of does and bucks in the population, percent of hunter harvest, natural mortality, and fawn/doe ratio. This formula predicted the yearly increase and was repeated 15 times to develop the prediction for the year 2000. For Allotment 293 antelope numbers are predicted to increase to 52 by the year 2000. The number of AUMs to be allocated to big game for Allotment 293 at the year 2000 was computed as follows:

Where:

Deer numbers = 17 (no change for existing)
Antelope numbers = 52
Total deer and antelope (69) ÷ Conversion Factor (5) = Animal Units (13.8)
Animal Units (13.8) x Months (12) = AUMs (166)

Mathematical Formulas for Predicted Antelope Increases for Proposed Action[1/]

Assume: Proper Age Class and Structure

Sex Ratio of fawn doe to fawn buck would be 1:1

Variables:

[2/] Number of Does in First Year = X

Number of Does in 2nd Year = X_2

[2/] Number of Bucks in First Year = Y

Number of Bucks in Second Year = Y_2

B = % Harvest (Bucks) 30%

D = % Losses due to natural mortality = 20%

[2/] G = Fawns per doe = .5

Does:

(X)(D) = F Does dying due to natural mortality

X-F = J Number of does available at breeding season

Assume: All does are capable of breeding

$(J)(G) \div 2 = H$ Number of either doe or buck fawns

$X_1 = H = X_2$ Doe totals for the year

Bucks:

$(Y_1)(D) = E$ Bucks dying due to natural mortality

$X_1 \div 4 = Z$ Number of bucks needed for reproduction, assuming all are capable.

$Y_1 - E - Z = W$ Number of bucks available to harvest, assuming buck only hunting.

(W)(B) = C Number of bucks harvested

$Y_1 - E - C = 1$ Number of bucks available at breeding time

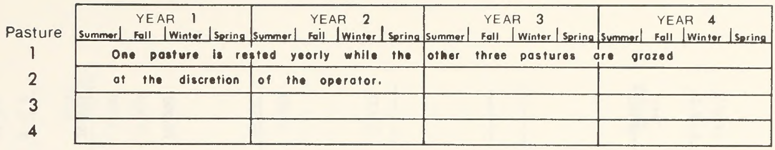
$Y_1 + H = Y_2$ Buck totals for the year

Total Antelope Numbers:

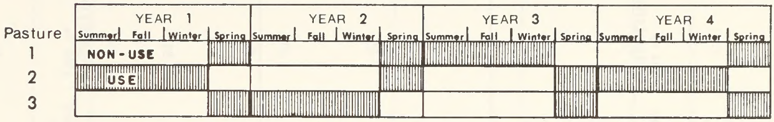
$X_2 + Y_2$ = Total Antelope Numbers

1/ Mathematical Formula developed in Socorro District Office.

2/ New Mexico Department of Game and Fish Flight Data.

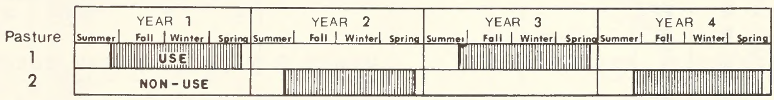


4-Pasture Scheduled Rest-Best Pasture Grazing System

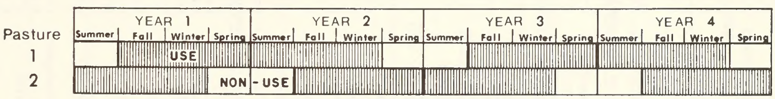


3-Pasture Rest Rotation Grazing System

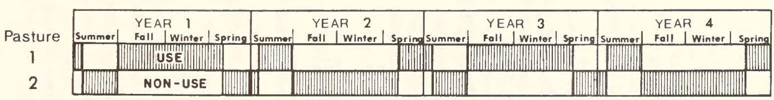
Continuous Seasonal Grazing System



2-Pasture Rotational Seasonal Grazing System



2-Pasture Rotational Deferment Grazing System



2-Pasture Deferred Rotation Grazing System

FIGURE A-6 EXAMPLES OF THE SIX TYPICAL GRAZING SYSTEMS PROPOSED IN THE ENVIRONMENTAL STATEMENT AREA

TABLE A-2

PROPOSED RANGE DEVELOPMENT AND AMP IMPLEMENTATION SCHEDULE

Allot. No.	Allot. Name	Developments	Units	Acres Disturbed /1 Short Term	Acres Disturbed /1 Long Term	Total Acres Disturbed Short Term	Total Acres Disturbed Long Term	Year of Survey and Design	Year of Construction	Cost	Total Cost /2
1. EXISTING AMPs WITHOUT ADJUSTMENTS OR DEVELOPMENTS											
036	Rio Puerco	None Proposed									
081	Lopez Community	None Proposed									
261	Sheep Canyon	None Proposed									
279	Silver Canyon	None Proposed									
289	Jornada Community	None Proposed									
300	Lucero Ind.	None Proposed									
II. EXISTING AMP WITH ADJUSTMENTS ONLY - FY80											
058	Canon Alamito	None Proposed									
059	La Jencia	None Proposed									
077	Ladron Peak	None Proposed									
091	Canada Colorado	None Proposed									
122	Abeytas	None Proposed									
253	E. Vigil Ind.	None Proposed									
256	Llano	None Proposed									
287	Gabaldon Ind.	None Proposed									
297	Puertecito del Lemitar	None Proposed									
317	San Pedro	None Proposed									
318	Pueblito Community	None Proposed									
III. EXISTING AMPS WITH ADJUSTMENT AND DEVELOPMENTS - FY80											
065	Arroyo Lucero	Well	1 ea.	.50	.10					15,550	
		Well Facility	1 ea.							10,715	
		Storage Tank	1/5,000 gal. ea.	.20	.10					1,575	
		Trough	1 ea.	2.50	2.50	3.20	2.70	79	80	460	28,300
121	Rio Salado West	Well	1 ea.	.50	.10					15,550	
		Well Facility	1 ea.							10,236	
		Storage Tank	1/2,000 gal. ea.	.20	.10					975	
		Trough	1 ea.	2.50	2.50					750	
		Fence	3.9 mi.	3.90	.78	7.10	3.48	79	80	11,802	39,313
129	Arroyo Colorado	Spring Development	1 ea.	.20	.05					2,100	
		Pipeline	9.6 mi.	14.40	.96					38,911	
		Storage Tank	6/5,000 gal. ea.	1.20	.60					9,450	
		Troughs	9 ea.	22.50	22.50					4,140	
		Wildlife Water	5 ea.	.10	.25	38.40	24.36	79	80	3,375	57,976

TABLE A-2 (continued)

PROPOSED RANGE DEVELOPMENT AND AMP IMPLEMENTATION SCHEDULE

Allot. No.	Allot. Name	Developments	Units	Acres Disturbed /1 Short Term	Acres Disturbed /1 Long Term	Total Acres Disturbed Short Term	Total Acres Disturbed Long Term	Year of Survey and Design	Year of Construction	Cost	Total Cost /2
254	Bordo Atravesado	Fence	1.2 mi.	1.20	.24	1.20	.24	79	80	3,200	3,200
255	Bosquecito	Fence	4.3 mi.	4.30	.86	4.30	.86	79	80	10,979	10,979
283	Blackington Mountain	Well	1 ea.	.50	.10					15,550	
		Well Facility	1 ea.							10,236	
		Pipeline	3.1 mi.	4.65	.31					13,471	
		Storage Tank	4/5,000 gal. ea.	.80	.40					6,300	
		Trough	4 ea.	10.00	10.00					1,840	
		Wildlife Water	2 ea.	.20	.10	16.15	10.91	79	80	1,350	48,747
288	Rio Grande	Storage Tank	1/2,000 gal. ea.	.20	.10	.20	.10	79	80	1,900	1,900
312	La Arenosa	Pipeline	4.7 mi.	7.05	.47					22,363	
		Storage Tank	2/5,000 gal. ea.	.40	.20					3,150	
		Trough	3 ea.	7.50	7.50					1,380	
		Wildlife Water	2 ea.	.20	.10					1,350	
		Fence	4.4 mi.	4.40	.88	19.55	9.15	79	80	9,490	37,733
IV. PROPOSED AMPs WITH ADJUSTMENTS ONLY - FY81											
083	Big Sandy Wash	None Proposed									
086	West Ladron	None Proposed									
294	Nogal Canyon	None Proposed									
323	Water Canyon	None Proposed									
360	Chupadera	None Proposed									
V. PROPOSED AMPs WITH ADJUSTMENTS AND DEVELOPMENTS - FY81											
006	Ojo Saladito	Well	1 ea.	.50	.10					15,550	
		Well Facility	1 ea.							10,391	
		Trough	1 ea.	2.50	2.50					460	
		Fence	3.2 mi.	3.20	.64					7,930	
		Cattleguard	1 ea.	.06	.06	6.26	3.30	80	81	1,250	35,581
016	Puertecito and Barranco	Pipeline	1.5 mi.	2.25	.15					4,523	
		Trough	2 ea.	5.00	5.00					1,478	
		Wildlife Water	2 ea.	.20	.10					1,350	
		Fence	7.5 mi.	7.50	1.50	14.95	6.75	80	81	18,670	26,021
258	Ojo de Amado	Spring Development	1 ea.	.20	.05					1,079	
		Pipeline	2.3 mi.	3.45	.23					7,271	
		Trough	2 ea.	5.00	5.00					920	
		Wildlife Water	2 ea.	.20	.10					1,350	
		Fence	2.9 mi.	2.90	.58	11.75	5.96	80	81	8,885	19,505

TABLE A-2 (continued)

PROPOSED RANGE DEVELOPMENT AND AMP IMPLEMENTATION SCHEDULE

Allot. No.	Allot. Name	Developments	Units	Acres Disturbed /1 Short Term	Acres Disturbed /1 Long Term	Total Acres Disturbed Short Term	Total Acres Disturbed Long Term	Year of Survey and Design	Year of Construction	Cost	Total Cost /2
263	Black Mesa	Well	1 ea.	.50	.10					15,550	
		Well Facility	1 ea.							10,236	
		Storage Tank	1/5,000 gal. ea.	.20	.10					1,575	
		Trough	1 ea.	2.50	2.50					739	
		Fence	3.8 mi.	3.80	.76	7.00	3.46	80	81	8,260	36,360
264	Armijo Community	Spring Development	1 ea.	.20	.05					2,039	
		Pipeline	1.9 mi.	2.85	.19					8,498	
		Storage Tank	2/5,000 gal. ea.	.40	.20					3,150	
		Trough	3 ea.	7.50	7.50					1,180	
		Wildlife Water	2 ea.	.20	.10					1,350	
		Fence	8.3 mi.	8.30	1.66	19.45	9.70	80	81	20,991	37,408
272	San Pasqual River	Fence	13.7 mi.	13.70	2.74					29,630	
		Cattleguard	3 ea.	.18	.18	13.88	2.92	80	81	3,750	33,380
285	Sand Mountain	Fence	3 mi.	3.00	.60	3.00	.60	80	81	6,255	6,255
290	Rock Spring Canyon	Well	1 ea.	.50	.10					15,550	
		Well Facility	1 ea.							10,226	
		Trough	1 ea.	2.50	2.50					749	
		Fence	2.8 mi.	2.80	.56					6,520	
		Cattleguard	1 ea.	.06	.06					2,325	
		Earthen Reservoir	3,000 c.y.	1.00	.50	6.86	3.72	80	81	5,060	40,430
293	Malpais	Fence	7.3 mi.	7.30	1.46	7.30	1.46	80	81	15,160	15,160
299	Pequeno	Fence	4.5 mi.	4.50	.90	4.50	.90	80	81	9,800	9,800
322	Parida	Spring Development	1 ea.	.20	.05					1,000	
		Pipeline	4.6 mi.	6.45	.46					14,153	
		Trough	3 ea.	7.50	7.50					1,380	
		Wildlife Water	3 ea.	.30	.15					2,025	
		Fence	3.3 mi.	3.30	.66					7,850	
		Cattleguard	1 ea.	.06	.06	17.81	8.88	80	81	1,250	27,658
328	Canon Quemado	Fence	2 mi.	2.00	.40					4,383	
		Cattleguard	1 ea.	.06	.06	2.06	.46	80	81	1,250	5,633
VI. PROPOSED AMPs WITH ADJUSTMENTS ONLY - FY82											
276	C. A. Bar	None Proposed									
277	San Jose Canyon	None Proposed									
347	Blue Springs	None Proposed									
VII. PROPOSED AMPs WITH ADJUSTMENTS AND DEVELOPMENTS - FY82											
012	Riley Community	Fence	1.6 mi.	1.60	.32					5,063	
		Cattleguard	2 ea.	.12	.12	1.72	.44	81	82	2,500	7,563

TABLE A-2 (continued)

PROPOSED RANGE DEVELOPMENT AND AMP IMPLEMENTATION SCHEDULE

Allot. No.	Allot. Name	Developments	Units	Acres Disturbed /1 Short Term	Acres Disturbed /1 Long Term	Total Acres Disturbed Short Term	Total Acres Disturbed Long Term	Year of Survey and Design	Year of Construction	Cost	Total Cost /2
114	Cerro del Oro	Well	2 ea.	1.00	.20					31,100	
		Well Facility	2 ea.							20,472	
		Storage Tank	2/5,000 gal. ea.	.40	.20					3,150	
		Trough	2 ea.	5.00	5.00					1,489	
		Fence	9 mi.	9.00	1.80					21,470	
		Cattleguard	1 ea.	.06	.06	15.46	7.26	81	82	1,650	79,331
152	Cerro Verde	Well	1 ea.	.50	.10					15,650	
		Well Facility	1 ea.							10,236	
		Pipeline	7.3 mi.	10.95	.73					29,014	
		Storage Tank	3/5,000 gal. ea.	.60	.30					4,725	
		Trough	4 ea.	10.00	10.00					1,840	
		Wildlife Water	3 ea.	.30	.15					2,025	
		Fence	2.8 mi.	2.80	.56	25.15	11.84	81	82	6,896	70,386
251	Harless	Pipeline	1.3 mi.	1.95	.13					3,712	
		Trough	1 ea.	2.50	2.50					460	
		Fence	7.2 mi.	7.20	1.44	11.65	4.07	81	82	14,600	18,772
252	Fernandez-Maestas	Fence	14.7 mi.	14.70	2.94					34,605	
		Cattleguard	5 ea.	.30	.30	15.00	3.24	81	82	6,250	40,855
262	Las Canas	Well	2 ea.	1.00	.20					31,200	
		Well Facility	2 ea.							20,572	
		Storage Tank	2/5,000 gal. ea.	.40	.20					3,150	
		Trough	2 ea.	5.00	5.00					1,478	
		Fence	2.8 mi.	2.80	.56					7,120	
		Cattleguard	1 ea.	.06	.06	9.26	6.02	81	82	1,250	64,770
266	Coyote Spring	Pipeline	5 mi.	7.50	.50					17,305	
		Storage Tank	1/5,000 gal. ea.	.20	.10					1,575	
		Trough	3 ea.	7.50	7.50					1,380	
		Wildlife Water	2 ea.	.20	.10					1,350	
		Fence	11 mi.	11.00	2.20	25.40	10.40	81	82	28,250	49,860
271	Mesa Redonda	Well	1 ea.	.50	.10					15,550	
		Well Facility	1 ea.							10,878	
		Pipeline	4.25 mi.	6.38	.43					17,965	
		Storage Tank	3/5,000 gal. ea.	.60	.30					4,725	
		Trough	4 ea.	10.00	10.00					1,840	
		Wildlife Water	3 ea.	.30	.15					2,025	
		Fence	4 mi.	4.00	.80	21.78	11.78	81	82	10,505	63,488
291	Prairie Spring	Pipeline	5.8 mi.	8.70	.58					14,478	
		Trough	4 ea.	10.00	10.00					1,840	
		Wildlife Water	3 ea.	.30	.15					2,025	
		Fence	2 mi.	2.00	.40	21.00	11.13	81	82	4,220	22,563
303	Carthage	Fence	1.5 mi.	1.50	.30	1.50	.30	81	82	3,230	3,230

TABLE A-2 (continued)

PROPOSED RANGE DEVELOPMENT AND AMP IMPLEMENTATION SCHEDULE

Allot. No.	Allot. Name	Developments	Units	Acres Disturbed /1 Short Term	Acres Disturbed /1 Long Term	Total Acres Disturbed Short Term	Total Acres Disturbed Long Term	Year of Survey and Design	Year of Construction	Cost	Total Cost/2
330	East Williams	Pipeline	1 mi.	1.50	.10					3,016	
		Storage Tank	1/5,000 gal. ea.	.20	.10					1,575	
		Trough	1 ea.	2.50	2.50					460	
		Fence	2.8 mi.	2.80	.56					6,295	
		Cattleguard	1 ea.	.06	.06	7.06	3.32	81	82	1,250	12,596
348	Cerro Montoso	Fence	2.2 mi.	2.20	.44	2.20	.44	81	82	6,250	12,596
349	Indian Peak	Fence	1 mi.	1.00	.20	1.00	.20	81	82	2,400	2,400
VIII. PROPOSED AMPs WITH ADJUSTMENTS ONLY - FY83											
052	Cerro Colorado	None Proposed									
089	Tsidu-Weza	None Proposed									
090	Petoch Wash	None Proposed									
295	Antelope Well	None Proposed									
315	Polvadera Community	None Proposed									
321	Puertecito Gap	None Proposed									
IX. PROPOSED AMPs WITH ADJUSTMENTS AND DEVELOPMENTS - FY83											
002	Mesa Carrizo	Pipeline	3.3 mi.	4.95	.33					11,214	
		Storage Tank	1/5,000 gal. ea.	.20	.10					1,350	
		Trough	2 ea.	5.00	5.00					920	
		Wildlife Water	2 ea.	.20	.10	10.35	5.53	82	83	1,575	15,059
037	Chavez Community	Fence	3.8 mi.	3.80	.76	3.80	.76	82	83	8,450	8,450
131	Los Valles	Fence	1.5 mi.	1.50	.30	1.50	.30	82	83	3,875	3,875
250	Milligan Gulch	Pipeline	4 mi.	6.00	.40					13,034	
		Storage Tank	2/5,000 gal ea.	.40	.20					3,150	
		Trough	2 ea.	5.00	5.00					920	
		Wildlife Water	2 ea.	.20	.10					1,350	
		Fence	7.4 mi.	7.40	1.48	19.00	7.18	82	83	16,155	34,609
260	Sierra Larga	Well	1 ea.	.50	.10					15,550	
		Well Facility	1 ea.							9,880	
		Pipeline	1.25 mi.	1.88	.13					5,016	
		Storage Tank	4/5,000 gal. ea.	.80	.40					6,300	
		Trough	2 ea.	5.00	5.00					920	
		Wildlife Water	1 ea.	.10	.05					675	
		Fence	3.8 mi.	3.80	.76	12.08	6.44	82	83	8,395	46,736
268	Torreon	Well	1 ea.	.50	.10					6,975	
		Well Facility	1 ea.							8,528	
		Pipeline	10.5 mi.	15.75	1.05					34,372	
		Storage Tank	1/5,000 ga. ea.	.20	.10					3,150	
		Trough	9 ea.	22.50	22.50					4,140	
		Wildlife Water	3 ea.	.30	.15					2,025	
		Fence	16.2 mi.	16.20	3.24					39,604	
		Cattleguard	2 ea.	.12	.12	55.57	27.26	82	83	2,500	101,294

TABLE A-2 (continued)

PROPOSED RANGE DEVELOPMENT AND AMP IMPLEMENTATION SCHEDULE

Allot. No.	Allot. Name	Developments	Units	Acres Disturbed /1 Short Term	Acres Disturbed /1 Long Term	Total Acres Disturbed Short Term	Total Acres Disturbed Long Term	Year of Survey and Design	Year of Construction	Cost	Total Cost /2
275	Adobe, Hansenburg, Padilla	Fence	5 mi.	5.00	1.00	5.00	1.00	82	83	10,420	10,420
280	Tecolote Draw	Pipeline	1.6 mi.	2.40	.16					4,653	
		Trough	1 ea.	2.50	2.50					460	
		Wildlife Water	1 ea.	.10	.05					675	
		Fence	11.3 mi.	11.30	2.26	16.30	4.97	82	83	27,699	33,487
284	Mesa Canyon Well	Pipeline	1.9 mi.	2.85	.19					6,048	
		Storage Tank	1/5,000 gal. ea.	.20	.10					3,150	
		Trough	2 ea.	5.00	5.00					920	
		Wildlife Water	2 ea.	.20	.10					1,350	
		Fence	4.5 mi.	4.50	.90					9,975	
		Cattleguard	1 ea.	.06	.06	12.81	6.35	82	83	1,250	22,693
298	Belcher-Corn	Pipeline	1.2 mi.	1.80	.12					3,790	
		Trough	1 ea.	2.50	2.50					460	
		Wildlife Water	1 ea.	.10	.05					675	
		Fence	2.6 mi.	2.60	.52	7.00	3.19	82	83	5,355	10,280
301	Bennett-Wilson	Pipeline	3.2 mi.	4.80	.32					7,783	
		Storage Tank	1/5,000 gal. ea.	.20	.10					3,150	
		Trough	2 ea.	5.00	5.00					920	
		Wildlife Water	1 ea.	.10	.05					675	
		Fence	3 mi.	3.00	.60	13.10	6.07	82	83	6,360	18,888
306	Veranito	Pipeline	3.9 mi.	5.85	.39					10,239	
		Trough	3 ea.	7.50	7.50					1,380	
		Wildlife Water	2 ea.	.20	.10					1,350	
		Fence	3.3 mi.	3.30	.66	16.85	8.65	82	83	7,868	20,837
308	Padilla Community	Fence	3.5 mi.	3.50	.70	3.50	.70	82	83	7,320	7,320
325	West Williams	Pipeline	3 mi.	4.50	.30					8,501	
		Storage Tank	2/5,000 gal. ea.	.40	.20					3,150	
		Trough	2 ea.	5.00	5.00					920	
		Wildlife Water	2 ea.	.20	.10					1,350	
		Fence	7.5 mi.	7.50	1.50					15,645	
		Cattleguard	2 ea.	.12	.12	17.72	7.22	82	83	2,500	32,066
327	Cedar Pass	Pipeline	2.5 mi.	3.75	.25					6,987	
		Trough	1 ea.	2.50	2.50					460	
		Wildlife Water	2 ea.	.20	.10					1,350	
		Fence	2.1 mi.	2.10	.42					4,528	
		Cattleguard	1 ea.	.06	.06	8.61	3.33	82	83	1,250	14,575

/1 Disturbance listed for fences - includes that for the associated roads,
Disturbance listed for troughs - includes that for sacrifice areas.
/2 Estimated 1977 Dollars

Source: Proposed AMPs, Socorro District

TABLE A-3

PLANNING SYSTEM INTERRELATIONSHIPS

LIVESTOCK MFP 1	OTHER RESOURCE STEP 1 MFP CONFLICTS WITH LIVESTOCK MFP RECOMMENDATIONS	MFP STEP 1 CONFLICTS (NARRATIVE)	MFP STEP 3 DECISION	RESOURCE TRADE-OFFS
RM-1.1	Wildlife 2.1			
Develop AMPs on 25 allotments in the Ladron Planning Unit.	Install and fence ground level waters where needed unit wide when new water pipelines are constructed.	Fencing of wildlife waters would inconvenience livestock operators by requiring maintenance or draining of storage tanks due to malfunctions.	Approve wildlife recommendation.	Possible temporary loss of waters in certain pastures due to malfunction of wildlife water.
	2.2			
	Implement grazing management systems on specific allotments to improve wildlife habitat.	An anticipated 20 percent livestock reduction would be necessary to improve wildlife habitat.	Develop objectives for wildlife habitat improvement for each allotment through the AMP process. Allocate vegetation for wildlife based on a range vegetation survey.	Food and cover for wildlife would be adjusted up or down based on Range Survey and AMP Process. It is anticipated some livestock reductions would occur to improve wildlife habitat.
	2.3			
	Partially fence selected reservoirs on public land in areas that would be of greatest benefit to wildlife habitat improvement.	Livestock could become trapped in fenced areas if not properly maintained.	Accept wildlife recommendation.	Negligible livestock losses would occur if fenced areas were not maintained. Livestock could become trapped in these fenced areas.
	2.5			
	Install three antelope type panels in the net wire fence located in T. 3N., R. 1W., Sections 20, 29, 30 if the population of antelope expands into the area.	The livestock operator would experience some inconvenience in his calf weaning operation.	Accept wildlife recommendation.	Accept negligible inconvenience to livestock operator during his calf weaning operation. This would not have any economic affect on the operator.
	3.1			
	Prohibit implementation of any development projects or surface disturbing activities on the Ladron Mountain Area pending completion of a faunal survey.	AMPs with proposed projects on 6 allotments within the Ladron Mountain Area cannot be implemented. AMPs and associated projects are subject to change pending completion of Ladron Mountain faunal survey.	Complete faunal survey of Ladron Mountain Area and restrict all surface disturbance as much as possible pending survey completion.	No significant resource losses would occur from delaying AMP implementation until after July 1978.

TABLE A-3 (continued)

PLANNING SYSTEM INTERRELATIONSHIPS

LIVESTOCK MFP 1	OTHER RESOURCE STEP 1 MFP CONFLICTS WITH LIVESTOCK MFP RECOMMENDATIONS	MFP STEP 1 CONFLICTS (NARRATIVE)	MFP STEP 3 DECISION	RESOURCE TRADE-OFFS
RM-1.1	4.2			
Develop AMPs on 25 allotments in the Ladron Planning Unit.	Acquire the Arroyo Salado (HA-2) Riparian Habitat Area and manage for the benefit of wildlife species. T. 5N., R. 3W., Section 2:N½ T. 6N., R. 3W., Section 35:S½	To manage for riparian habitat a portion of the 640 acre Arroyo Salado Habitat Area would require fencing, thereby eliminating a certain amount of existing livestock use.	Accept wildlife recommendation.	Livestock use on the Mesa Carrizo Allotment would be reduced by 7 AUMs.
	4.3			
	Acquire Laguna Bonita (HA-3) Riparian Habitat Area and manage for the benefit of wildlife species. T. 6N., R. 5W., Section 28:S½NW¼	Acquiring the riparian habitat would adversely affect the livestock operator economically since it is also a base water.	Develop an agreement to acquire an easement to fence a portion of Laguna Bonita and manage habitat for benefit of wildlife species.	Five to ten acres of riparian habitat encompassing the base water would accommodate livestock use. The remaining 150 acres of riparian habitat would be unavailable to livestock. The Mesa Del Oro Allotment would be reduced by 17 AUMs.
	4.4			
	Acquire the Ponia Creek Riparian Habitat Area and manage for the benefit of wildlife species. T. 7N., R. 4W., Section 7:All; Section 18:NW¼, N½SW¼, SW¼SW¼; Section 19:All	Continued grazing use on 1,56D acres of this riparian habitat would adversely affect the wildlife species present.	Develop an agreement with the landowners to acquire the land in Ponia Creek by exchange and manage it as riparian habitat for benefit of wildlife.	Livestock use on the Arroyo Lucero Allotment would be reduced by 18 AUMs.
	Recreation			
	1.1			
	Beginning in FY 77, manage the Class II Visual Resource Areas of the planning unit according to Class II Standards.	Intensive grazing use on approximately 3,DDD acres of Class II Visual Resources could increase erosion, thereby increasing degradation of the visual resources through soil exposure and vegetative loss.	Accept Recreation Recommendation 1.1.	Livestock use affecting approximately 3,DOD acres would have to be adjusted through design and implementation of AMPs.

TABLE A-3 (continued)

PLANNING SYSTEM INTERRELATIONSHIPS

LIVESTOCK MFP 1	OTHER RESOURCE STEP 1 MFP CONFLICTS WITH LIVESTOCK MFP RECOMMENDATIONS	MFP STEP 1 CONFLICTS (NARRATIVE)	MFP STEP 3 DECISION	RESOURCE TRADE-OFFS
RM-1.1	Recreation (continued) 1.2			
Develop AMPs on 25 allotments in the Ladron Planning Unit.	Beginning in FY 77, manage the Class III Visual Resource Areas in the planning unit according to Class III Standards.	Intensive grazing use on approximately 45,000 acres of Class III Visual Resources could contribute to degradation of the visual resource by increasing soil erosion through vegetative removal, trampling, and project installation.	Accept Recreation Recommendation 1.2.	Livestock use affecting approximately 45,000 acres would have to be adjusted through design and implementation of AMPs.
	1.3			
	Beginning in FY 77, manage the Class IV Visual Resource Areas in accordance with Class IV Standards.	Intensive grazing use on approximately 35,000 acres of Class IV Visual Resources with moderate to severe erosion could increase erosion through removal of vegetation, livestock trampling, and range development installation.	Accept Recreation Recommendation 1.3	Livestock use affecting approximately 35,000 acres would have to be adjusted through AMP design and implementation.
	3.1			
	Study Ladron Mountain as a potential Wilderness Area by FY 80. Manage the area as a de-facto wilderness until study is completed.	Intensive livestock grazing would aggravate erosion on approximately 3,200 acres of the study area. Range developments would detract from the wilderness character.	Accept Recreation Recommendation 3.1.	Livestock use on 3,200 acres of moderate erosion class lands would have to be adjusted through the design and implementation of AMPs. Any range developments associated with AMPs affecting the 18,000 acre study area would be delayed or eliminated pending the completion of the wilderness study in FY 80.

TABLE A-3 (continued)

PLANNING SYSTEM INTERRELATIONSHIPS

LIVESTOCK MFP 1	OTHER RESOURCE STEP 1 MFP CONFLICTS WITH LIVESTOCK MFP RECOMMENDATIONS	MFP STEP 1 CONFLICTS (NARRATIVE)	MFP STEP 3 DECISION	RESOURCE TRADE-OFFS
RM-1.1	Recreation (continued) 6.1			
Develop AMPs on 25 allotments in the Ladron Planning Unit.	Designate all public lands in the planning unit as open to off-road vehicle use.	Disturbance of livestock and destruction of vegetation could occur on areas experiencing ORV use. Intensive grazing could be disrupted by ORV use on rangelands.	Restrict ORV use to existing roads and trails.	An undetermined amount of visitor days attributed to ORV use could be lost. Recreation ORV use in the planning unit is low. Ranchers would be restricted in their ORV travel. This would be more of an inconvenience than a hardship.
	Watershed 1.1			
	Reduce soil surface factors an average of 10-15 points on all allotments suitable for intensive management by development and implementation of AMPs.	Development and implementation of AMPs would create some economic stress on ranchers due to initial adjustments of livestock required to protect watershed values.	Accept watershed recommendation.	Grazing systems and numbers of livestock on 25 allotments would be adjusted by design and implementation of AMPs.
	1.2			
	Allocate sufficient vegetative production through grazing management to increase average ground cover on each watershed area.	Livestock grazing on some areas may need to be removed or reduced to attain the desired level of cover.	Accept watershed recommendation.	Livestock numbers and grazing systems would require adjustment through AMP implementation.
	3.1			
	Provide watershed protection on the unit by prohibiting the construction of new roads and trails.	Proper management of intensive livestock grazing may require the construction of new roads and trails.	Construct roads on an "as needed basis" for the management of all resources.	Some watershed values may be lost in the construction of new roads and trails supporting the implementation of grazing systems. However, more watershed protection would result from the implementation of AMPs.

TABLE A-3 (continued)

PLANNING SYSTEM INTERRELATIONSHIPS

LIVESTOCK MFP 1	OTHER RESOURCE STEP 1 MFP CONFLICTS WITH LIVESTOCK MFP RECOMMENDATIONS	MFP STEP 1 CONFLICTS (NARRATIVE)	MFP STEP 3 DECISION	RESOURCE TRADE-OFFS
RM-1.1	Minerals 2.2			
Develop AMPs on 25 allotments in the Ladron Planning Unit.	Plan for the orderly development of the coal resources in the Datil Mountain Coal Field.	Coal development on two allotments affecting approximately 7,000 acres would destroy livestock forage and disrupt livestock management.	If the Datil Coal Field is nominated for leasing, an EAR would be completed to consider all resource values.	Possible loss of livestock AUMs if the 7,000-acre area is leased and developed for coal.
	2.3			
	Plan for the orderly development of the geothermal resources within the planning unit by FY 83.	Numbers of livestock grazing on 16 allotments affecting approximately 163,000 acres could be subject to a downward adjustment. Structures, roads and production associated with geothermal development could cause disruption of livestock management.	Prepare environmental assessments for geothermal actions on a case or area basis as needed.	Leasing or developing geothermal resources would be delayed until an environmental assessment has been completed. Some form of livestock and/or grazing system adjustment would be required on areas approved for leasing and developing.
	Lands 1.1			
	Establish utility corridors along existing powerline and pipeline rights-of-way in the eastern portion of the planning unit by FY 79.	Livestock use on approximately 5,000 acres would be limited or eliminated by construction of utilities and associated roads.	Accept lands recommendation.	Livestock use would be adjusted through the development of AMPs on 3 allotments in order to accommodate a utility corridor.
RM-1.3				
Manage six allotments as non-AMP areas in the Ladron Planning Unit.	There are no apparent conflicts with other resources.	None	Accept range Recommendation RM-1.3.	The grazing capacity on six non-AMP allotments would be adjusted to protect and enhance other resource values on public lands. Past experience indicates that livestock numbers on scattered public lands in non-AMP areas scheduled for reduction, would remain the same. Livestock operators are not motivated to accept proposed reductions where public lands make up a small percentage of the non-AMP allotment. For all practical purposes the reductions are unenforceable and the operator usually does not adjust livestock numbers.

TABLE A-3 (continued)

PLANNING SYSTEM INTERRELATIONSHIPS

LIVESTOCK MFP 1	OTHER RESOURCE STEP 1 MFP CONFLICTS WITH LIVESTOCK MFP RECOMMENDATIONS	MFP STEP 1 CONFLICTS (NARRATIVE)	MFP STEP 3 DECISION	RESOURCE TRADE-OFFS
RM-1.1	Wildlife 1.2			
Develop AMPs on 63 allotments in the Stallion Planning Unit	Determine the optimum amount of water that is needed in Elephant Butte Marsh for rookery nesting species and for nesting of the Mexican Duck.	Intensive livestock grazing would be eliminated on approximately 300-800 acres pending the findings of an optimum habitat study. This would affect 1 allotment and involve an economic loss to the rancher.	Accept wildlife recommendation. Develop the plan with Bureau of Reclamation to insure water is available.	Grazing would be eliminated on approximately 600 acres of Bosque lands. Livestock use on the allotment would be reduced 972 AUMs to provide for wildlife habitat.
	1.4			
	Develop a grazing system within the next two years that would exclude livestock grazing from the period of April 1 through July 31 of each year in Elephant Butte Marsh.	Intensive livestock grazing totaling 84 AUMs would be eliminated on 600 acres of Elephant Butte Marsh. The allottees would be experiencing some degree of economic adversity.	Develop a grazing system in cooperation with the allottee by 1978 that is compatible with wildlife and livestock management.	Forage allocation for livestock and wildlife on the Elephant Butte Marsh Area would be cooperatively determined through development of an AMP.
	2.1			
	Develop a cooperative agreement with the Bureau of Reclamation to manage wildlife habitat on 18,700 acres of Reclamation lands.	Intensive livestock management may have to be adjusted to reflect wildlife values.	Seek an understanding with the Bureau of Reclamation to determine the extent the existing livestock agreement applies to wildlife.	Adjustments in forage allocation to livestock would be accomplished through AMPs on 4 allotments if the cooperative agreement on wildlife management can be reached.
	2.2			
	Improve interspersion of habitat for all species in the Bosque Area by burning selected small areas of salt cedar.	Intensive livestock management may have to be adjusted to accommodate this wildlife habitat improvement.	Seek an understanding with the Bureau of Reclamation to determine the extent the existing livestock agreement applies to wildlife.	Adjustments in forage allocation to livestock would be accomplished through AMPs on 4 allotments if the cooperative agreement on wildlife management can be reached.

TABLE A-3 (continued)

PLANNING SYSTEM INTERRELATIONSHIPS

LIVESTOCK MFP 1	OTHER RESOURCE STEP 1 MFP CONFLICTS WITH LIVESTOCK MFP RECOMMENDATIONS	MFP STEP 1 CONFLICTS (NARRATIVE)	MFP STEP 3 DECISION	RESOURCE TRADE-OFFS
RM-1.1	Wildlife (continued) 3.2			
Develop AMPs on 63 allotments in the Stallion Planning Unit	Partially fence off all reservoirs that are on public lands.	Livestock use of the reservoirs may conflict with partial fencing of reservoirs by becoming trapped. Possible livestock may be lost.	Partially fence selected reservoirs in areas that would be of greatest benefit to wildlife habitat improvement.	Livestock operators may suffer slight economic loss or inconvenience in management if livestock become entrapped in partially fenced reservoirs.
	3.4			
	Identify, develop and fence springs and seeps that are suitable primarily for wildlife.	Livestock numbers and grazing may be adjusted to reflect a loss of use of these waters.	Develop springs for the benefit of both wildlife and livestock only in areas classified as being in moderate or better erosion condition.	By developing springs that would also accommodate livestock use, wildlife habitat and use would be diminished.
	3.7			
	Implement grazing management systems on specific allotments to improve wildlife habitat by providing food and cover for wildlife species.	Wildlife species may be adversely affected by severe competition resulting from intensive livestock grazing.	Develop objectives for wildlife habitat improvement for each allotment through the AMP process.	Intensive livestock grazing may require adjustments in use and numbers to accommodate wildlife values on allotments.
	4.1			
	Alter net wire fence with ten 100-foot panels or other means which would insure free movement by antelope.	Intensive livestock grazing systems may be hindered by livestock passing through antelope panels. Increase antelope movement to previously unavailable habitat may result in increased competition between antelope and livestock.	Install antelope panels or passes wherever necessary to facilitate the free movement of antelope.	Livestock operator may suffer some inconvenience by livestock moving into wrong pastures, particularly during weaning. Livestock numbers and use may be adjusted through an AMP to manage for increased wildlife values.
	7.2			
	Provide protection to the oak species in the Nogal Canyon Area primarily for the benefit of the band tailed pigeon.	Intensive livestock grazing may be somewhat disrupted by increased recreation use resulting from increased wildlife populations.	Provide for protection of oak species in the Nogal Canyon South Area through the development of an AMP or by intensive custodial management.	Livestock adjustments may be required through the AMP process in order to protect oak species and enhance the band tailed pigeon. Inconveniences to livestock operation such as open gates or unauthorized ORV use may have to be tolerated to a degree.

TABLE A-3 (continued)

PLANNING SYSTEM INTERRELATIONSHIPS

LIVESTOCK MFP 1	OTHER RESOURCE STEP 1 MFP CONFLICTS WITH LIVESTOCK MFP RECOMMENDATIONS	MFP STEP 1 CONFLICTS (NARRATIVE)	MFP STEP 3 DECISION	RESOURCE TRADE-OFFS
RM-1.1	Wildlife (continued) 8.1			
Develop AMPs on 63 allotments in the Stallion Planning Unit	Increase the density of key browse species such as mountain mahogany, four-wing saltbush, Mormon tea and apache plume on all allotments within the pinyon-juniper vegetative type.	Managing browse species for the benefit of wildlife could conflict with intensive management of available forage for the benefit of livestock.	Increase density and improve vigor of key browse species within the pinyon-juniper vegetative type through improved livestock management practices.	To ensure adequate browse for wildlife, livestock grazing systems and numbers may require adjustments through development and implementation of an AMP.
	Recreation 2.1			
	Manage Nogal Canyon South as a Class III visual resource in accordance with BLM Manual 6310.18.	Developments associated with intensive livestock grazing may be eliminated or restricted in the Class III Visual Resource Area, thereby affecting grazing use of the area.	Reject recreation recommendation R2.1. Maintain present management until if at all possible, private lands are acquired. Classify as a Class II Visual Resource only if private lands are acquired.	Under existing management, the quality of the visual resources in Nogal Canyon South may deteriorate below the standards required for designation.
	4.1, 4.2, 4.3 Combined			
	Initiate a program to help maintain a litter free aesthetic environment at Amado Springs (4.1) by closing the access road to all forms of traffic (4.2) and managing as a Class III Visual Resource (4.3).	The livestock operator may be inconvenienced in his management operations by the road closure, and by possible restrictions on range developments to meet Visual Resource Class III standards.	Accept combined recommendations.	Livestock operator may experience some inconvenience in managing his operation. His management may require some minor adjustment to accommodate the visual resource objectives of the area.
	5.1, 5.2, 5.3 Combined			
	Close the Soaptree Yucca Area to off-road vehicle use and vegetative sales (5.1). Restrict grazing use in the delineated Soaptree Yucca Area from June 15-September 1 (5.2). Manage the Soaptree Yucca Area as a Class III Visual Resource (5.3).	Intensive livestock grazing in the Soaptree Yucca Area would be restricted on a seasonal basis. Livestock adjustment may be required to ensure the aesthetics of a Class III Visual Resource. Restriction of ORV travel may inconvenience the livestock operator during his management of grazing.	Accept combined recommendations.	Grazing systems and livestock numbers may be adjusted to accommodate the botanical values of the 3,200-acre yucca area. Livestock operators may be inconvenienced by the ORV restriction and increased recreation use.

TABLE A-3 (continued)

PLANNING SYSTEM INTERRELATIONSHIPS

LIVESTOCK MFP 1	OTHER RESOURCE STEP 1 MFP CONFLICTS WITH LIVESTOCK MFP RECOMMENDATIONS	MFP STEP 1 CONFLICTS (NARRATIVE)	MFP STEP 3 DECISION	RESOURCE TRADE-OFFS
RM-1.1	Recreation (continued) 7.1, 7.2, 7.3 Combined			
Develop AMPs on 63 allotments in the Stallion Planning Unit	Secure a cooperative agreement with the Bureau of Reclamation to give BLM total management control of 2,000 acres of land and water resources in the Elephant Butte Marsh Area (7.1). Designate Elephant Butte Marsh as a Research Natural Area (7.2). Manage Elephant Butte Marsh as a Class II Visual Resource (7.3).	Intensive livestock grazing on 1 allotment in the Bosque would be adversely affected. Total management control of 2,000 acres, designation as a research area and management as a Class II Visual Resource, may result in economic losses due to possible livestock reductions. Grazing management may be altered or impeded by increased visitor use for recreation.	Reject recreation recommendation R-7.1, 7.2 and 7.3.	Intensive livestock grazing may be adjusted to protect aesthetic and wildlife value not adequately considered under existing cooperative agreements. Lack of designation and management for wildlife and aesthetic values may result in loss of valuable wildlife and an undetermined amount of recreation visitor use.
	8.1			
	Designate 606,000 acres of the Stallion Planning Unit as open to ORV use unless otherwise closed.	Allotments where ORV use occurs may experience disruption to livestock grazing, vandalism to developments, and loss of vegetation.	Restrict off-road vehicle use to existing roads and trails.	Less than 1,000 visitor days of ORV recreation opportunities would be eliminated. Livestock operators may experience some inconvenience in restricting their use of vehicles. Enforcement of this policy may put a heavy burden on District personnel.
	10.1			
	Manage the Nogal Canyon North Area as a Class III Visual Resource.	Range developments accompanying intensive grazing may cause intrusions on visual resources.	Accept recreation recommendation R-10.	Intensive livestock grazing may require adjustment through development of an AMP to be compatible with Class III Visual Resources.

TABLE A-3 (continued)

PLANNING SYSTEM INTERRELATIONSHIPS

LIVESTOCK MFP 1	OTHER RESOURCE STEP 1 MFP CONFLICTS WITH LIVESTOCK MFP RECOMMENDATIONS	MFP STEP 1 CONFLICTS (NARRATIVE)	MFP STEP 3 DECISION	RESOURCE TRADE-OFFS
RM-1.1	Recreation (continued) 13.1, 13.2, 13.3, 14.1 Combined			
Develop AMPs on 63 allotments in the Stallion Planning Unit	Study the Cerro Montoso Site for scientific research and stabilization needs (R-13.1). Study the waterfall petroglyphs for preservation and protection (R-13.2). Analyze the stabilization needs of the Fernandez Site and implement any resulting program (R-13.3). Stabilize and interpret AR-30-02-205, a historic Pueblo.	Fencing these cultural sites for protection would eliminate intensive livestock grazing from approximately 20 acres on 3 separate allotments.	Accept recreation recommendations R-13.1, R-13.2, R-13.3, and R-14.1.	Protection of 3 cultural resource sites covering approximately 20 acres would require fencing, thereby eliminating grazing from the areas.
	15.1, 15.2, 15.3 Combined			
	Beginning in FY 78, manage the Class II Visual Resource Areas of the planning unit in accordance with Class II Standards (15.1). Beginning in FY 78 manage the Class III Visual Resource Areas in the planning unit in accordance with Class III Standards (15.2). Beginning in FY 78, manage the Class IV Visual Resource Areas of the planning unit according to Class IV Standards.	Intensive grazing use on visual resource having an SSF of 50 or greater may contribute to degradation of the visual resource by exacerbating soil erosion through vegetative removal, trampling, and range development installation. The approximate acres affected are: Class II - 300 acres Class III - 60,000 acres Class IV - 240,000 acres	Accept recreation recommendations 15.1, 15.2, and 15.3.	Intensive livestock use and management, affecting approximately 300,000 acres of land with an SSF of 50 or greater, would require adjustment through development of an AMP.
	Watershed 1.1, 1.2, 1.3 Combined			
	1.1 Reduce soil surface factors (SSF) an average of 10-15 points on all allotments (61) suitable for intensive management by development and implementation of AMPs. 1.2 Reduce SSFs 10-15 points on custodial management allotments by intensifying livestock use, supervision and adjusting stocking rates where necessary.	Management for watershed values may require reduction in livestock use and numbers. Range developments could be eliminated or restricted in some areas of critical erosion.	Accept watershed recommendation 1.1.	Livestock use and numbers may require adjustment through development of AMPs. Livestock operators may experience a degree of economic loss. Watershed values would improve.

TABLE A-3 (continued)

PLANNING SYSTEM INTERRELATIONSHIPS

LIVESTOCK MFP 1	OTHER RESOURCE STEP 1 MFP CONFLICTS WITH LIVESTOCK MFP RECOMMENDATIONS	MFP STEP 1 CONFLICTS (NARRATIVE)	MFP STEP 3 DECISION	RESOURCE TRADE-OFFS
RM-1.1	Watershed (continued)			
Develop AMPs on 63 allotments in the Stallion Planning Unit	1.3 Allocate sufficient vegetative production (live vegetation and litter) to increase average ground cover on each watershed area as identified.			
	3.1			
	Provide watershed protection on the unit by prohibiting the construction of new roads and trails.	Eliminating or restricting construction of new roads and trails may adversely limit intensive livestock grazing on certain allotments, which require these developments for effective grazing management.	Construct roads only on an as needed basis for the development and management of all resources. The impacts of the proposed construction would be analyzed.	Intensive livestock grazing would benefit by the construction of necessary roads. The visual, soil, and watershed resources would be adversely affected by road construction. Road construction in support of better grazing systems could, in the long term, result in overall improvement to all the resources which would outweigh the minor adverse impacts.
	4.1			
	Designate 606,000 acres of the Stallion Planning Unit as open to ORV use unless otherwise closed.	Allotments where ORV use occurs may experience disruption to livestock grazing, vandalism to developments, and loss of vegetation.	Restrict off-road vehicle use to existing roads and trails.	Less than 1,000 visitor days of Orv recreation opportunities would be eliminated. Livestock operators may experience some inconvenience in restricting their use of vehicles. Enforcement of this policy may put a heavy burden on District personnel.
	Forestry			
	1.1			
	Prohibit all off-road vehicle use in the pinyon-juniper areas that have a moderate or higher erosion classification.	Livestock management that requires off-road travel may be restricted. This would be an inconvenience to ranchers and possibly cause an economic loss.	Close to off-road vehicle use all pinyon-juniper areas with a moderate or higher erosion classification. Adding special use requests would be considered and authorized on the closed areas on a case by case basis.	Wildlife, watershed, and aesthetics of pinyon-juniper areas may be adversely affected by allowance of ORV for livestock management purposes. Livestock operators may receive special permission for ORV travel to enhance their livestock management and reduce the possibilities of economic losses from an ORV restriction.

TABLE A-3 (continued)

PLANNING SYSTEM INTERRELATIONSHIPS

LIVESTOCK MFP 1	OTHER RESOURCE STEP 1 MFP CONFLICTS WITH LIVESTOCK MFP RECOMMENDATIONS	MFP STEP 1 CONFLICTS (NARRATIVE)	MFP STEP 3 DECISION	RESOURCE TRADE-OFFS
RM-1.1	Forestry (continued) 1.2			
Develop AMPs on 63 allotments in the Stallion Planning Unit	First priority in AMP preparation should be developing and/or revising AMPs on all allotments within pinyon-juniper areas having a moderate or higher erosion classification.	Management for forestry values in moderate to high pinyon-juniper erosion areas may require reductions in livestock use and numbers. Some livestock operators would experience economic losses.	Prepare AMPs on priority basis as outlined in RM 1.1 and 1.2.	Reductions in livestock use and numbers would not necessarily occur in pinyon-juniper areas due to other priorities. Watershed, wildlife, soils, and aesthetic values of some watershed areas would continue to deteriorate from non-AMP grazing use.
	Minerals			
	1.1			
	Make available public lands within the planning unit that are suitable for geothermal development by completion of an environmental assessment.	Intensive livestock grazing on 41 allotments affecting 366,572 acres of public land may be subject to adjustments in use and numbers resulting from geothermal leasing actions. Geothermal testing and developments could cause an undetermined amount of surface disturbance during development and occupy certain lands now used for grazing. The livestock operator would be economically affected by any livestock reductions.	Complete environmental analysis on proposed geothermal lease areas to determine if they are suitable for leasing.	Livestock adjustments may be required.
	1.2			
	The Jornada Lava Flow in area 2, Rio Grande Trough, would remain open to mineral leasing until there is sufficient data to indicate that minerals are not present in the area.	Open mineral leasing accompanied by exploration and development could create disruptions in livestock management and reduce or eliminate portions of existing grazing areas.	Leave the Jornada Lava Flow open to mineral leasing subject to a minimum of road and trail construction in exploration and development activities.	Leasing, exploration, and development activities on approximately 18,000 acres would continue, thereby benefiting the energy industry. Livestock numbers on 1 allotment may require adjustments.

TABLE A-3 (continued)

PLANNING SYSTEM INTERRELATIONSHIPS

LIVESTOCK MFP 1	OTHER RESOURCE STEP 1 MFP CONFLICTS WITH LIVESTOCK MFP RECOMMENDATIONS	MFP STEP 1 CONFLICTS (NARRATIVE)	MFP STEP 3 DECISION	RESOURCE TRADE-OFFS
RM-1.1	Minerals (continued) 1.4			
Develop AMPs on 63 allotments in the Stallion Planning Unit	If a private industry study of the Jornada Coal Field shows a minable coal bed, especially one of coking quality, then prepare an environmental assessment which would determine the impacts of such a mining operation, the lands to make available for lease contracts, and the precautionary measures to be implemented.	Livestock use and numbers on 12 allotments may require adjustments due to coal leasing affecting approximately 87,000 acres.	Accept minerals recommendation 1.4.	Leasing exploration and development activities on part or all of 87,000 acres affecting 12 allotments could result in development of coal resources. Livestock operations may require adjustments in grazing systems and numbers to accommodate vegetation disturbed or lost as a result of leasing activities.
	3.1			
	Oppose any closures or withdrawals prohibiting mineral entry and subsequent development on public lands and mineral reserves within the planning unit.	Livestock grazing on public lands not yet developed or explored for minerals could be adversely affected by mining activities. Vegetation could be lost due to roads and surface disturbance resulting from mining activities.	Close areas to mineral entry only after environmental assessment indicates that valuable resources would be lost or destroyed.	Mining activities would occur on fewer acres of grazing lands due to the environmental assessments. Grazing systems and uses would be adjusted to accommodate a certain amount of mining activities.
	Lands			
	2.1			
	Efforts should be made to coordinate the location of utility corridors on existing sites between planning units and within other districts.	Establishing utility corridors could result in larger rights-of-way to accommodate more utilities in a corridor. Loss of vegetation from disturbance may require livestock adjustments. Corridors may affect physical fencing of allotments and require additional expenses for modifying existing developments.	Identify and establish utility corridors in the District by the end of FY 78.	Livestock operations could require adjustments in use and number. This could be accomplished through an AMP.

TABLE A-3 (continued)

PLANNING SYSTEM INTERRELATIONSHIPS

LIVESTOCK MFP 1	OTHER RESOURCE STEP 1 MFP CONFLICTS WITH LIVESTOCK MFP RECOMMENDATIONS	MFP STEP 1 CONFLICTS (NARRATIVE)	MFP STEP 3 DECISION	RESOURCE TRADE-OFFS
RM-1.1	Lands (continued) 6.1			
Develop AMPs on 63 allotments in the Stallion Planning Unit	Make public lands in the Stallion Planning Unit available to the U. S. Army for use as an Extension Area for missile firing.	Livestock operators would be inconvenienced due to the requirement of evacuation of all civilians from the Extension Area during firing. Possible damage to livestock and range developments may result from missiles. Range fires could be caused by missiles, thereby causing severe economic hardship to the livestock operator.	Consider use of public lands as Extension Areas for missile firings.	Resource values in the Planning Unit would be given consideration before reaching a decision. A smaller extension area would impact fewer resources, including livestock operations. Any decisions on the extension area would be incorporated into the appropriate AMPs.
	Range 5.2			
	Provide sufficient forage in New Tank, New Well, and Bustos Pastures for the 20-30 head of horses on Allotment 254.	The livestock operator would experience a long term economic loss as permanent livestock reductions are necessary to provide forage for the wild horses.	Reduce livestock AUMs to support a maximum of 30 wild horses.	To support 30 existing horses the livestock operator would be reduced 360 AUMs.
RM-2.1				
Manage twenty allotments as non-AMP areas in the Stalliun Planning Unit	There are no apparent conflicts with other resources.	None	Accept Range Recommendation.	The grazing capacity on twenty non-AMP allotments would be adjusted to protect and enhance other resource values on public lands. Past experience indicates that livestock numbers on scattered public lands in non-AMP areas scheduled for reduction, would remain the same. Livestock operators are not motivated to accept proposed reductions where public lands make up a small percentage of the non-AMP allotment. For all practical purposes the reductions are unenforceable and the operator usually does not adjust livestock numbers.

Source: BLM Socorro District File.

APPENDIX 2

VEGETATION

TABLE A-4

SCIENTIFIC NAME EQUIVALENTS FOR COMMON NAMES OF PLANTS USED IN THE TEXT AND CAPTIONS

Common Name	Code	Scientific Nomenclature
Grasses		
Alkali sacaton	Spai	Sporobolus airoides
Annual windmill grass	Chvi	Chloris virgata
Black grama	Boer	Bouteloua eriopoda
Blue grama	Bogr	Bouteloua gracilis
Burrograss	Scbr	Scleropogon brevifolius
Bush muhly	Mupo	Muhlenbergia porteri
Dropseeds (sand, mesa, spike)	SPOR	Sporobolus spp.
Ear muhly	Muar	Muhlenbergia arenacea
Fluffgrass	Trpu	Tridens pulchellus
Galleta	Hija	Hilaria jamesii
Giant dropseed	Spgi	Sporobolus giganteus
Gyp dropseed	Spne	Sporobolus nealleyi
Indian ricegrass	Orhy	Oryzopsis hymenoides
Mesa dropseed	Spfl	Sporobolus flexuosus
Muhlys	MUHL	Muhlenbergia spp.
Needle and thread	Stco	Stipa comata
New Mexico feathergrass	Stne	Stipa neomexicana
Pappus grass	PAPP	Pappophorum spp.
Purple muhly	Muri	Muhlenbergia rigida
Ring muhly	Muto	Muhlenbergia torreyi
Sacaton	Spwr	Sporobolus wrightii
Saltgrass	Dist	Distichlis stricta
Sand dropseed	Spcr	Sporobolus cryptandrus
Side-oats grama	Bocu	Bouteloua curtipendula
Sixweeks fescue	Feoc	Festuca octoflora
Sixweeks grama	Boba	Bouteloua barbata
Sixweeks three-awn	Arad	Aristida adscensionis
Southwestern needlegrass	Stem	Stipa eminens
Spike dropseed	Spco	Sporobolus contractus
Squirreltail	Sihy	Sitanion hystrix
Three-awn	ARIS	Aristida spp.
Tobosa	Himu	Hilaria mutica
Vine mesquite	Paob	Panicum obtusum
Western wheatgrass	Agsm	Agropyron smithii
Wolftail	Lyph	Lycurus phleoides
Forbs		
Amsonia	Amhi	Amsonia hirtella
Annual snakeweed	Gugl	Gutierrezia glutinosa
Bitterweed	Hyod	Hymenoxys odorata
Blueweed	Heci	Helianthus ciliaris
Buckwheats	ERIO	Eriogonum spp.
Carelessweed	AMAR	Amaranthus spp.
Castetter milkvetch	Asca	Astragalus castetteri
Cattails	Tyla	Typha latifolia
Cocklebur	Xasa	Xanthium saccharatum
Common bahia	BAHI	Bahia spp.
Cutleaf sunflower	Hela	Helianthus laciniatus
Flintmountain milkvetch	Assi	Astragalus siliceus
Grama cactus	Pepa	Pediocactus papyracanthus
Hog potato	Hode	Hoffmanseggia densiflora
Ladron spiderwort	Trwr	Tradescantia wrightii
Marsh parsley	Alfi	Aletes filifolius
Marsh sunflower	Hepr	Helianthus praetermissus
Mogollon draba	Drmo	Draba mogollonica
Multistem beeplant	Clmu	Cleome multicaulis
Paradox sunflower	Hepa	Helianthus paradoxus
Pecos bladderpod	Lepr	Lesquerella praecos
Plank's silene	Sipl	Silene plankii
Pricklepoppy	Arpl	Argemone pleiacantha
Rhizome fleabane	Errh	Erigeron rhizonmatous
Rock daisy	Pest	Perityle staurophylla
Russian thistle	Saka	Salsola kali
Sandy prairieclover	Pesc	Petalostemum scariosum
Scarlet figwort	Scco	Scrophularia coccinea
Sealavender	Lili	Limonium limbatum
Spectacle pod	Diwi	Dithyrea wislizeni
Tansy mustard	Depi	Descurainia pinnata
Vernal thelypody	Thve	Thelypodium vernale
Whorles milkweed	Assu	Asclepias subverticillata
Wooton loco	Aswo	Astragalus wootoni
Zuni milkvetch	Asac	Astragalus accumbens

TABLE A-4 (continued)

SCIENTIFIC NAME EQUIVALENTS FOR COMMON NAMES OF PLANTS USED IN THE TEXT AND CAPTIONS

Common Name	Code	Scientific Nomenclature
Shrubs and Trees		
Alligator juniper	Jude	Juniperus deppeana
American tarbush	Flce	Flourensia cernoa
Apache-plume	Fapa	Fallugia paradoxa
Brickellbush	BRIC	Brickellia spp.
BurroburGsh	HYME	Hymenoclea spp.
Cholla	Opim	Opumtia imbricata
Cottonwood	Pofr	Populus fremontii
Creosotebush	Latr	Larrea tridentata
Desert olive	Flsh	Florestiera shrevei
Desert rose	Rost	Rosa stellata
Desert sumac (Little-leaf)	Rhmi	Rhus microphylla
Feather dalea	Dafo	Dalea formosa
Four-wing saltbush	Atca	Atriplex canescens
Hairy coldenia	Cohi	Coldenia hispidissima
Hairy mountain mahogany	Cebr	Cercocarpus breviflorus
Jones saltbush	Atjo	Atriplex jonesii
Mariola	Pain	Parthenium incanum
Mesquite	Prju	Prosopis juliflora
Mormon tea	Eptr	Ephedra trifurca
Ocotillo	Fosp	Fouquieria splendens
One-seed juniper	Jumo	Juniperus monosperma
Pinyon	Pied	Pinus edulis
Prickly-leaf dogweed	Dyac	Dyssodia acerosa
Rabbitbrush	CHRY	Chrysothanmnus spp.
Saltcedar	Tape	Tamarix pentandra
Sand sagebrush	Arfi	Artemisia filifolia
Scrub live oak	Qutu	Quercus turbinella
Snakeweed	Gusa	Gutierrezia sarothrae
Spicebush	Alwr	Aloysia wrightii
Squawbush	Rhtr	Rhus trilobata
Willow	SALI	Salix spp.
Winterfat	Eula	Eurotia lanata
Wolfberry	LYCI	Lycium spp.
Yucca	YUCC	Yucca spp.

Source: Spellenberg Consultants, 1977; and USDA-FS, 1974

Existing Environment

Range and Soil Survey

Vegetation in the ES Area was surveyed from 1975 to 1977. The range survey delineated vegetative types and determined vegetative density, composition, and grazing capacity of each range type. Soils were surveyed from 1976 to 1978. The soil survey process delineated soil mapping units, and these were correlated to range sites.

Relationship of Soils to Range Sites

Range sites are the ecological subdivisions used to study and evaluate the rangeland within the ES Area. Range sites, with their various environmental factors, are combined to designate MLRAs. MLRAs (as delineated by SCS) are geographic areas of land, several thousand acres in extent, that are characterized by particular patterns of soil, climate, water resources, and land use (Map 2-2). Range sites were correlated between the four MLRAs, in the ES Area (Table A-5, p. A-40), on the basis of species composition, proportion of species, and total production of the potential plant communities. A copy of the SCS Range Site Guides applicable for each kind of rangeland is maintained in the BLM Socorro District Office.

TABLE A-5

PHYSICAL CHARACTERISTICS OF FOUR MLRAs

MLRAs	Approx. Elevation	Average Annual Precipitation	Temperature Regime of Soils	Topographic Features
Southern Desertic Basins, Plains and Mountains (SD)	4,500-6,000 ft.	7-9 in.	Thermic	Desert Basin and Valleys
Pecos - Canadian Plains and Valleys (CP)	5,500-7,000 ft.	8-10 in.	Mesic	Mesas, Valleys, and Mountains
New Mexico and Arizona Plateaus and Mesas				
WP-2	6,000-8,000 ft.	10-13 in.	Mesic	Plateaus and Mesas
WP-3	5,000-8,000 ft.	10-13 in.	Mesic	Plateaus and Mesas

Source: U. S. Department of Agriculture, Soil Conservation Service

Correlating Range Survey Data to Soil Survey Data

Range type boundaries were delineated on maps. A range type is a plant community with distinct and specific species composition, density, and vegetative aspect. Soils overlays were superimposed over the range type maps, and each range type was classified into a range site. The range type transect data, along with the appropriate range site designation, was summarized and averaged. Existing grazing capacity, vegetative density and cover, and weighted proper use factors were analyzed by vegetative type per range site, MLRA, and allotment.

Range Condition

Range condition was analyzed using a BLM developed variation of the SCS method. Range condition is an expression of the relative degree to which the kinds, proportions, and amounts of plants in a plant community resemble that of the climax plant community for the site. Range condition was determined by comparing the present plant community with that of the climax plant community, as indicated by the range condition guide for the site.

The most recently developed SCS "Range Site . . . Guide" (1967 and 1977) for rating range condition was used for each site. The amount of all climax species not in excess of that shown on the guide is totaled to indicate the relative ecological rating or numerical evaluation of the stand. This procedure is illustrated by Figure A-7, p. A-43. It shows that mesa

dropseed (Spfl) and sand dropseed (Spcr) make up 14 percent of the vegetative composition of the range types occurring on the loamy range site within allotment 293. However, according to the "Range Site . . . Guide," these species should make up 10 percent of the vegetative composition in the potential or climax community. Therefore, in this procedure, they only can count as 10 points in determining condition. The range condition rating would be between 0 and 100 depending on how closely the particular plant community resembles the climax plant community for the range site. Four classes are used to express the degree to which the composition of the present plant community reflects that of the climax. They are:

Range Condition Class	Percentage of Present Plant Community that is Climax for the Range Site
Excellent	76-100
Good	51-75
Fair	26-50
Poor	0-25

Therefore, in the example, range condition was classified as good.

TABLE A-6

EXISTING RANGE CONDITION OF ALLOTMENTS

Allot.	Excellent		Good		Fair		Poor		No Cond. /1		%
No.	Public	Other	Public	Other	Public	Other	Public	Other	Public	Other	/2
AMPs											
002			2,530	4,865	9,188	22,478	1,812	4,911	1,042	1,697	84
006			2,148	496	8,706	1,605	396	380			81
012			22	31	1,547	870			225	34	98
016					11,832	11,558	169	222	511	1,545	100
036					9,050	112	1,807	24	1,102	1	100
037			9,177	1,225	2,457	824			241	152	24
052					1,376	686				34	100
058			1,768	638	1,698	320	153				47
059			9,189	3,729	8,450	5,580			389	353	52
065			576	867	9,723	15,883	861	1,952	1,107	2,123	95
077			2,022	779	373	1,058			1,881	460	34
081			233	150	5,246	161	230	9	160		94
083			470		164						35
086			13,093	1,022	10,516	2,456	123	489	186		49
089					292	256	21	23	8	44	100
090			2,513	1,061	6,418	3,573	78	66	180	10	74
091			986		5,922	66			486	14	86
114			3,293	5,288	10,636	18,242	1,375	2,349	1,615	3,775	79
121			3,135	122	3,747	1,805			649	250	63
122					1,666	636	632		502	1,981	100
129		57	1,389	1,197	24,166	25,812	4,366	8,586	4,629	2,143	96
131			102	434	3,277	6,654		473			95
152			1,623	1,893	8,719	14,485	292	1,693	876	2,497	88
250					6,843	1,445	5,762	2,095	344	1,481	100
251		65	3,563	3,176	3,867	6,133		33		359	60
252			8,065	1,006	8,313	2,311	1,262	328			57
253			693	6	1,824		594				78
254			11,361	2,880	3,659	584	2,054	274	3,814	537	32
255				119	2,373	757	2,350	528			98
256			4,072	948	7,896	1,995	714	162			68
258					7,100	1,694	3,816	261			100
260			3,523	1,125	4,966	3,449	291	103	3,691	1,247	65
261			1,862	576	15,482	4,584	524	189	6,848	53	89
262			391	411	11,622	10,547	298	130			97
263			4,817	1,556	8,005	3,919	182	1,590	650	881	68
264			191	170	8,284	1,718	84	193			97
266			5,698	1,511	3,397	9			2,264	638	32
268			7,955	2,142	18,399	7,294			13	92	72
271			5,318	4,876	5,852	3,887	222				49
272			7,068	2,074	5,497	998	451	128	6,406		44
275			11,082	13,281	17,674	20,606	1,698	4,529	2,306	2,048	65
276			2,083	680	277						9
277					7,402	2,580	7,467	2,424	3,400	3,419	100
279					8,527	1,461	5,483	768	4,399	520	100
280			8,449	1,440	3,578	2,353			1,580	629	37
283			171	39	14,328	5,009	1,810	1,352		151	99
284					8,535	2,891	205	31			100
285			7,402	131	14,148	6,031			120	43	73
287			3	141	4,311	659					97

TABLE A-6 (continued)

EXISTING RANGE CONDITION OF ALLOTMENTS

Allot. No.	Excellent Public	Excellent Other	Good Public	Good Other	Fair Public	Fair Other	Poor Public	Poor Other	No Cond. /1 Public	No Cond. /1 Other	% /2
AMPs (cont.)											
288					2,063		2,350	600	93	196	100
289			3,472	1,473	4,605	1,120					54
290			2,950	2,495	4,440	2,457			195	189	56
291			5,796	685	3,708	265			162	10	38
293			16,846	2,315	20,579	3,161					55
294			138	597	1,196	4,863	3,009	1,135	130	463	93
295			2,463	3,593	5,806	8,141			367	795	70
297					4,527	1,134	9,340	4,188	618	189	100
298			1,823	3,154	1,053	1,486					34
299					9,852	1,481	303	5	1,187	106	100
300					1,168	834		58	411	1,028	100
301	1,241	1,838	5,066	3,821	9,590	7,899	1,810	434		4	62
303			285		422						60
306					5,131	1,029					100
308					4,074	598	165		597	93	100
312					1,577		7,668	47	158		100
315					3,133	779	106		268	42	100
317					434		2,240	188	537	346	100
318					3,330	115	1,835	48			100
321			252		4,969	6,295		42	14	1	98
322			90	134	10,610	4,120			143	2,469	99
323			4,050	2,951	3,115	2,570			182	449	45
325			5,890	1,607	2,571	2,454	605	641	98		46
327			3,108	237	5,864	2,604					72
328			2,878	699	1,022	946	590	275			44
330	2,169	1,716	67	1,422	876	1,874					35
347			470	114							0
348			1,611	61	587	99					29
349			534	4	777						59
360			205	317	2,422	1,438					88
NON-AMPs											
017					3,122						100
113					103		187				100
134					6		1,392				100
143					310						100
145			320		3,622						92
164							203				100
165			15		21		60				84
267			2,448								0
281			2,424		3,290						58
282					960						100
286							371		5		100
296			5,312		1,012						16
302							371		4		100
310			1,298		76						6
311							79		30		100
340			1,688		397						19
341			106								0
342			831		823						50
343			1,543								0
345			956				102		135		10
350			202		1,148						85
351			209		1,238				133		86
352			3,498		300						8
353			630		830						57
354					80						100
355			1,696						19		0
356					510		71				100
357					48		911		168		100
358			2,340		36						2
361			402		78						16
362			98		65						40
363									2,379		0
TOTAL	3,410	3,676	232,046	87,761	484,904	285,796	81,350	43,956	59,657	35,591	

/1 No Condition - These are areas where SCS has not developed range site guides. This is because these areas are low producing sites such as badlands, steep slopes, and river washes. In addition, a small amount of acreage was included because a soil survey was not completed.
/2 Percent of allotment in poor and fair range condition.

Source: Range Survey, Socorro County Soil Survey, SCS Range Site Guides

Figure A-7

Allotment - Malpais 293

Range Site: Loamy (SD)

Range Types: BH-3B, BH-40

COMPARISON OF "RANGE SITE GUIDE" TO "RANGE TYPE WRITEUPS" IN DETERMINING RANGE CONDITION

Species	Potential*	Average of the Range Types*	Range Condition Points
Grasses			
Black grama	20	10	10
Bush muhly	20	0	0
Burrograss, Three-awn, Ring muhly, Fluffgrass	10	11	10
Sand Dropseed, Mesa dropseed	10	14	10
Galleta, Alkali sacaton	20	47	20
Cane bluestem, Bristlegrass, Arizona cottontop	5	0	0
Maximum Points Allowed For Grasses	80		
Forbs			
Annual			
Perennial			
Maximum Points Allowed For Forbs	10		
Shrubs			
Yucca, Mormon tea, Four-wing saltbush	15	1	1
Broom snakeweed	3		
Mesquite, Cactus	3		
Maximum Points Allowed For Shrubs	10		

Total: 51
Range Condition: Good

* Values are percent composition (i.e., Black grama makes up 20 percent of the potential plant community).

Source: Range Survey and SCS Range Site Guides, Socorro District

Range Trend

Range trend is unknown over most of the ES Area. This includes allotments with and without AMPs. Therefore, because of a lack of reliable data for the purpose of analysis, range trend is assumed to be stable. This assumption is based on the following:

1. Socorro District personnel determined apparent range trend on 23 allotments during 1977. Trend was estimated to be static on 19 allotments, down on 3, and up on 1.

2. In addition, 20 sites were selected throughout the ES Area. The trend of vegetative and soil conditions on these sites was estimated by comparing the 1975 aerial photographs to those taken during the 1950's. It was not possible to detect any changes on most of the photos.

3. A 24-year study on allotment 268 suggests that trend is up on some sites within its boundaries. However, the plots are not representative of the entire allotment. The results of this study are contained in the BLM Socorro District Office.

Long-Term Predictions

Range Condition

The existing range condition data and the vegetal increases predicted by the AMP writers were used as the basis for predicting future range condition. It was assumed that an increase in vegetal AUMs reflects an improvement in range condition. For each projected 1-percent increase in vegetation, a .2-percent increase in the total acreage that improves by one range condition class is projected. Table A-7 shows projections of improved range condition made for the Proposed Action and each alternative.

Table A-7

PREDICTION OF RANGE CONDITION

Projected Vegetal Increase (From Table A-18)	Total Acreage that Improves by One Range Condition Class	Total Acreage that Remains in the Same Condition Class
25 percent	5 percent	95 percent
50 percent	10 percent	90 percent
75 percent	15 percent	85 percent
100 percent	20 percent	80 percent

For example: Total vegetation under the No Action Alternative is expected to increase 9 percent (from Table A-18, p. A-58) in the long term. Therefore, the acreages in the excellent, good, and fair condition classes are projected to increase by 1.8 percent.

Potential Production

A BLM developed variation of the SCS method was used to estimate potential production. The soil mapping units delineated during the soil survey were classified into range sites. The respective SCS Range Site Guides were used to estimate the total potential production for each site in each MLRA. Four steps are used to calculate potential grazing capacity in ac/AUM. The steps are illustrated using the sandy range site in the SD MLRA.

Step 1. Potential vegetative production was interpreted from the SCS Range Site Guide as follows:

Favorable year (SCS Range Site Guide)	750 lbs/ac
Unfavorable year (SCS Range Site Guide)	250 lbs/ac
Average year (BLM estimate)	500 lbs/ac

Step 2. The weighted proper use factor (PUF) for the range site was calculated by applying the Socorro District PUF to each species occurring in the climax community. It is found by multiplying the composition (in percent) of a plant species by PUF for that species. This is a weighted PUF for an individual species. The sum of the weighted PUFs equals the weighted PUF for the range site. Table A-8, p. A-45, shows how the weighted PUF is calculated.

Step 3. The forage requirement of an AUM was determined to be 750 lbs/AUM.

Step 4. Calculations for determining potential productivity, usable forage, and grazing capacity on a 640-acre sandy range site:

a. Acres times potential production (SCS Range Site Guide) equals total potential production per section
640 ac. x 500 lbs/ac = 320,000 lbs/section

b. Total potential production per section times weighted PUF equals potential usable forage per section.
320,000 lbs/sec. x .333 = 106,560 lbs/section

c. Potential usable forage per section divided by forage requirements of an AUM equals potential production expressed in ac/AUM.
106,560 lbs/sec. ÷ 750 lbs/AUM = 142 AUMs/section
640 ac ÷ 142 AUMs = 4.5 Ac/AUM

The potential production for range sites is summarized in Table A-9, p. A-46.

TABLE A-8

EXAMPLE OF HOW THE WEIGHTED PROPER USE FACTOR WAS CALCULATED FOR THE SANDY(SD) RANGE SITE

Species	Composition of the Potential Plant Community	PUF%/1		Weighted PUF
Grasses				
Black grama	25	55		.1375
Mesa dropseed		50		
Sand dropseed	15	50	50	.075
Spike dropseed		50		
Bush muhly		45		
Bristlegrass	10	30	40	.04
Arizona cottontop		55		
Cane bluestem		30		
Tobosa	5	45		.0225
Three-awn	10	10		.01
Fluffgrass	5	40		.02
Forbs				
Croton		5		
Buckwheat		0		
Globemallow		10		
Astragalus spp.		0		
Euphorbia spp.	10	0	2.2	.002
Spectacle pod		5		
Desert holly		0		
Desert bailya		0		
Filaree		0		
Threadleaf groundsel		0		
White horsenettle	5	0	2.5	.0013
Russian thistle		10		
Tansy mustard		0		
Woody				
Soaptree yucca	10	15	17.5	.0175
Mormon tea		20		
Sandsage		10		
Four-wing saltbush		50		
Mountain mahogany	3	40	20.2	.0061
Broom snakeweed		1		
Broom dalea		0		
Mesquite	2	10	7.5	.0015
Cholla		5		
			Weighted Proper Use Factor =	.3334

/1 Bureau of Land Management, Socorro District. Proper Use Factors

Source: SCS Range Site Guide and Range Survey, Socorro District

TABLE A-9

POTENTIAL PRODUCTIVITIES OF RANGE SITES

Range Site	Total Production lbs/ac.	PUF	Usable Forage lbs/ac.	Grazing Capacity CYLs/sec.	AUMs/sec.	ac/AUMs
Southern Desert (SD)						
Deep Sand	425.0	.324	137.7	9.8	117.5	5.4
Sandy	500.0	.333	166.5	11.8	142.1	4.5
Shallow Sandy (656) 30% Rock Outcrop	341.3	.408	139.2	9.9	118.8	5.4
Loamy	425.0	.399	169.6	12.1	144.7	4.4
Bottomland	1,550.0	.421	652.6	46.4	556.8	1.2
Limestone Hills (634) 30% Rock Outcrop	315.0	.338	106.5	7.6	90.9	7.0
Malpais (657) 35% Rock Outcrop	316.9	.464	147.0	10.5	125.5	5.1
Gypsum	200.0	.307	61.4	4.4	52.4	12.2
Gravelly	312.5	.260	67.5	4.8	57.4	11.1
Igneous Hills (689) 50% Rock Outcrop	250.0	.339	84.8	6.0	72.3	8.9
Pecos-Canadian Plains and Valleys (CP)						
Sandy	575.0	.382	219.7	15.6	187.4	3.4
Loamy	450.0	.365	164.3	11.7	140.2	4.6
Bottomland	2,500.0	.442	1,105.0	78.6	942.9	0.7
Limestone Hills (35% Rock Outcrop)	260.0	.312	81.0	5.8	69.0	9.3
Gravelly	675.0	.397	268.0	19.1	229.0	2.8
Gypsum Hills	325.0	.307	100.0	7.1	85.1	8.9
Hills (40% Rock Outcrop)	435.0	.472	205.0	14.6	175.0	3.7
Gypsum (736-Neeto)	353.0	.409	144.4	10.3	123.5	5.2
Malpais	600.0	.358	214.8	15.3	183.0	3.5
New Mexico and Arizona Plateaus and Mesas (WP-2)						
Basalt Hills	975.0	.409	398.8	28.0	340.0	1.9
Bottomland	2,800.0	.532	1,489.6	106.0	1,271.0	0.5
Gypsum Flats	225.0	.306	68.9	4.9	58.8	10.9
Loamy	600.0	.416	249.7	18.0	213.0	3.0
Malpais	800.0	.365	291.8	21.0	249.0	2.6
Sandstone Hills	450.0	.316	165.6	12.0	141.0	4.5
Sandy	525.0	.407	213.7	15.0	182.0	3.5
Shallow	600.0	.407	244.2	17.0	208.0	3.1
Shallow Sandstone	500.0	.383	191.3	14.0	163.0	3.9
Limestone Hills	625.0	.340	212.5	15.0	181.0	3.5
New Mexico and Arizona Plateaus and Mesas (WP-3)						
Basalt Hills	975.0	.409	398.8	28.0	340.3	1.9
Bottomland	2,750.0	.518	1,424.5	101.0	1,216.0	0.5
Gravelly	1,050.0	.461	483.5	34.0	413.0	1.5
Hills	1,000.0	.366	365.9	26.0	312.0	2.1
Loamy	750.0	.404	302.6	22.0	258.0	2.5
Malpais	800.0	.365	291.8	21.0	249.0	2.6
Sandy	650.0	.392	254.8	18.0	217.0	2.9
Shallow	950.0	.417	396.2	28.0	338.0	1.9
Limestone Hills	625.0	.340	212.5	15.0	181.0	3.5

Source: Range Site Guides, Socorro District

Proposed Action

Assumptions

In the Proposed Action utilization of key species would average 50 percent. Present utilization of vegetation is heavy (60 to 80 percent). There would be a 30-percent reduction in livestock numbers. Since no actual livestock use data is available, it is assumed that the Proposed Action is reducing utilization from a heavy to a moderate level.

Methods

The AMP writers selected from two to seven key areas on each allotment scheduled for an AMP. Key areas guide the general management of the entire area.

The AMP writers also located "comparison areas" for most of the key areas. Comparison areas are generally located on the same allotment as its key area and usually support a higher successional stage of vegetation. The better vegetative conditions are due to a lighter use or no livestock grazing and indicate the goal for which the BLM will manage.

Vegetative parameters on key areas were compared to the vegetation on associated comparison areas. The comparisons were based on the data gathered by using the toe-point transects to determine species composition and density in both areas. All key and comparison area data is filed in the respective AMPs in the BLM Socorro District Office. The AMP writers then used their judgment based on comparison area data and predicted how much vegetation would improve on key areas in the long term. They did not try to separate the effects of livestock adjustments from those of grazing system implementation; instead they expected both actions to occur simultaneously. Below is an example of how the predicted increases were determined using key and comparison area data for allotment 293. The key area is located in vegetative subtype HT-40 which was used as the example in Appendix 1, Range Survey Methodology (Figure A-3, p. A-12). The comparison area is located on White Sands Missile Range which has been ungrazed since the early 1940s.

Key Area #3			Comparison Area #3		
% Forage Density	Key Species	% Comp.	% Forage Density	Key Species	% Comp.
	Boer	57		Boer	75
	Spfl	20		Spfl	5
	Spco	4		Spco	1
11			17		

PREDICTION FOR KEY AREA #3 IN THE LONG TERM

% Forage Density	Key Species	% Comp.
	Boer	70
	Spfl	10
	Spco	4
15		

The same kind of predictions were made for every set of key and comparison area data from all 79 AMPs. The soil survey information and maps were then used to classify each area the predictions represented into range sites. Key and comparison areas #3 shown above are located on a sandy range site within the Southern Desert (SD) MLRA. These predictions were added to all sandy SD prediction data. Average predicted increases in density, cover, and composition were then computed using the same technique for each range site by MLRA. Using these average predicted increases, predicted vegetative production for the Proposed Action at year 2000 was computed for each range site by MLRA and expressed in ac/AUM using the same procedure as in the range survey. Table 2-2 shows the average grazing capacity (ac/AUM) for each range site in the ES Area for the Existing Environment (EE) and the Proposed Action (PA) and alternatives by vegetative type and MLRA. The predictions made based on key and comparison areas #3, from allotment 293, are expressed in the average ac/AUM figures shown for the sandy range site, desert shrub vegetative type, SD-MLRA. The grazing capacity expressed in ac/AUM for this site is projected to improve from 10.3 ac/AUM to 6.2 ac/AUM.

The last step was to then divide the number of acres in each range site (by allotment) by the predicted change (ac/AUM) to get predicted vegetative AUMs. This was done for each range site (by allotment) to arrive at the total predicted vegetative AUMs for each allotment. The total predicted vegetative AUMs under the Proposed Action for Allotment 293 is 8,286 and is shown on Table A-18, p. A-58.

To arrive at the long term (20th year) predicted livestock AUMs, the long term wildlife AUMs, and unsuitable AUMs were deducted from predicted vegetative AUMs. The long-term predicted livestock use levels are shown for each allotment on Table A-24, p. A-83. For allotment 293, the AUMs needed to provide adequate forage for predicted wildlife numbers is 166. Refer to Appendix 1, p. A-15, Methodology for Determining Existing Deer and Existing and Predicted Antelope Numbers. There is no unsuitable range on allotment 293. As shown on Table A-18, p. A-58, total long-term vegetative AUMs for allotment 293 for the Proposed Action are 8,286. Therefore:

8,286 (Predicted long-term vegetative AUMs) - 166 (Predicted long-term wildlife AUMs)

= 8,120 (Predicted long-term livestock AUMs, Table A-24, p. A-86)

No Action Alternative

Assumptions

Two assumptions are needed before the No Action Alternative can be analyzed: 1) Livestock use would be adjusted on the 25 existing AMP allotments, and these allotments would continue to be intensively managed; 2) Livestock use on the other allotments would not be adjusted, and AMPs would not be implemented.

Methods

Because of the adjustments and continued intensive management, the vegetative improvement on the 25 existing AMPs would be the same as for the Proposed Action. On the other allotments vegetative conditions would not improve but would be the same as in the Existing Environment.

Vegetative Production

Existing AMP Allotments

Under the No Action Alternative existing AMPs would receive livestock adjustments as in the Proposed Action and would continue to be intensively managed. Long-term predictions would be the same as under the Proposed Action. Vegetative production on existing AMP allotment 058 is going to increase to 630 AUMs in the long term, the same response as under the Proposed Action (Table A-18, p. A-58). Livestock forage in the long term would be 613 AUMs (Table A-24, p. A-83). Long-term livestock forage equals long-term vegetative production (630 AUMs) minus long-term wildlife allocation (17 AUMs)

Proposed AMP Allotments

Proposed AMP allotments under this alternative would not receive livestock adjustments or AMPs. For allotment 293 livestock use would remain at the present grazing use level, 6,264 AUMs (Table A-1, p. A-4), in both the short and long term. This is also shown on Table A-24, p. A-86.

Livestock Adjustment Alternative

Assumptions

All non-AMP allotments for both the Proposed Action and this alternative would respond similarly because of livestock adjustments.

This alternative assumes that livestock adjustments would be made and no additional AMPs would be implemented. However, the 25 existing AMP allotments would continue to be intensively managed. Thus, vegetative AUMs on these allotments would be the same as for the Proposed Action.

Methods

Grazing systems and grazing intensity studies were reviewed. The grazing research literature was interpreted to derive the following predictions:

1. Table A-10, p. A-50, shows that vegetative production would increase 51 percent when livestock use is reduced from heavy to moderate. The 51 percent is an overall average for the western states and is used because no site specific research is available. Table A-11, p. A-50, shows that vegetative production would increase by 18 percent when grazing systems are implemented. The 18 percent is an overall average for the western states and is used because no site specific research is available. These values were adjusted proportionally to account for the total vegetative increase predicted in the Proposed Action. Thus, grazing systems and livestock adjustments account for 26 and 74 percent of the vegetal increases predicted in the Proposed Action, respectively.

2. Table A-12, p. A-51, shows that cover would increase by 75 percent when grazing is reduced from heavy to moderate. The 75 percent is an overall average for the western states and is used because no site specific research is available. Table A-13, p. A-51, shows that cover would increase by 30 percent when grazing systems are implemented on ranges that have been continuously grazed. The 30 percent is an overall average for the western states and is used because no site specific research is available. These values were adjusted proportionally to account for the total density and cover increase predicted in the Proposed Action. This analysis expects the percentage response of cover because density is considered to represent the live vegetation component of cover. Thus, grazing systems and livestock adjustments account for 29 and 71 percent of the increases predicted in the Proposed Action, respectively.

Vegetative Production

Existing AMP Allotments

Under the Livestock Adjustment Alternative existing AMPs would receive livestock adjustments as in the Proposed Action and would continue to be intensively managed; long-term predictions would be the same as under the Proposed Action. Vegetative production on existing AMP allotment 058 is going to increase to 630 AUMs in the long term; this would be the same response as under the Proposed Action (Table A-18, p. A-58). Livestock forage in the long term would be 613 AUMs (Table A-24, p. A-83). Long-term livestock forage (613) equals Long term vegetative production (630 AUMs) minus Long-term wildlife allocation (17 AUMs).

Proposed AMP Allotments

Of the vegetative production increases expected in the Proposed Action, 74 percent are due to the livestock adjustments. The AUMs expected on allotments (Excluding the 35 existing AMP allotments) under the Livestock Adjustment Alternative in the long term

= (.74) (Long-term Proposed Action AUMs - Range Survey AUMs) + (Range Survey AUMs).

Allotment 293 for example:

Range Survey AUMs	= 6,267 (Table A-18, p. A-58)
Long-term Proposed Action AUMs	= 8,286 (Table A-18, p. A-58)
Long-term Livestock Adjustment AUMs	= [.74 (8,286 - 6,267)] + 6,267
	= 7,761 (Table A-18, p. A-58)

Cover

Density and cover values were calculated for range sites by vegetative type and MLRA (Table 2-2). Each value is a weighted average for the total area of a range site by vegetative type and MLRA.

Of the density and cover increases expected in the Proposed Action, 71 percent are due to the livestock adjustments. The density expected under the Livestock Adjustment Alternative

= (.71) (Long-term Proposed Action Density - Range Survey Density) + (Range Survey Density).

The cover expected under the Livestock Adjustment Alternative

= (.71) (Long-term Proposed Action Cover - Range Survey Cover) + (Range Survey Cover).

Example:

For the Sandy Range Site, Desert Shrub vegetative type, SD-MLRA, Table 2-2.

Range Survey Density = .11
Long-Term Proposed Action Oensity = .14

Long-Term Livestock Adjustment Oensity = .71 (.14 - .11) + .11
= .13

TABLE A-10

VEGETATIVE PRODUCTION WHEN LIVESTOCK USE IS REDUCED FROM HEAVY TO MODERATE

Percent Change	Heavy Grazing (60-80%) (lbs/ac.)	Moderate Grazing (40-60%) (lbs/ac.)	Comments	Adapted From
1*	1,399	1,409	Mid-grasses	Klipple and Bement (1961)
49	974	1,454	Mid-grasses	Klipple et al (1961)
	-400**	0	Mid-grasses	Klipple et al (1961)
98	62	122	Mid-grasses	Klipple et al (1961)
14	1,096	1,245	Short grass	Klipple et al (1961)
42	470	668	Blue grama	Klipple et al (1961)
8*	520	561	Blue grama	Hanson et al (1970)
Average: 51				

* Treated as outlyers
** In this study, heavy grazing produced 400 lbs/ac less than a comparable area grazed moderately.

Source: References cited above

TABLE A-11

VEGETATIVE PRODUCTION WHEN GRAZING SYSTEMS ARE IMPLEMENTED ON RANGELANDS THAT HAVE PREVIOUSLY BEEN GRAZED CONTINUOUSLY WITH A MODERATE OR PROPER STOCKING RATE

Percent Change	Grazing Systems (lbs/ac.)	Continuous Use (Proper Stocking) (lbs/ac.)	Adapted From
18	368	312	Martin and Ward (1976)
39*	89	64	Martin (1973)
15	12,396	10,773	Owensby, Smith, and Anderson (1974)
20	11,619	9,644	Owensby, Smith, and Anderson (1974)
18	731	620	Smoliak (1960)
5*	489	465	Smoliak (1960)
214*	319	102	Aldon and Garcia (1967)
254*	552	156	Rio Puerco ES (1978)
Average: 18			

* Treated as outlyers

Source: References cited above

TABLE A-12

COVER VALUES WHEN GRAZING IS REDUCED FROM HEAVY TO MODERATE USE

Percent Change	Cover: Heavy Grazing (60-80%)	Cover: Moderate Grazing (40-60%)	Comments	Adapted From
150	18	45	Percent	Pond (1961)
75	44	77	Percent	Pond (1961)
69	45	76	Percent	Pond (1961)
24	1,232	1,531	Standing Dead and Mulch, lbs/ac.	Hanson et al (1970)
55	-1.8	-0.8	Plant Cover	Smith, D. (1967)
11	1,817	2,012	Lbs/ac. Total Cover	Lewis et al (1956)
0	-55	-55	Ground Cover (%)	Launchbaugh (1957)
200	866	2,602	Mulch, lbs/ac.	Dahl et al (1967)
95	-180	+2	Mean Basal Area Black Grama on Meter Sq. Quadrants	Paulsen (1961)

Average: 75

Source: References cited above

TABLE A-13

COVER VALUES WHEN GRAZING SYSTEMS ARE IMPLEMENTED ON RANGELANDS THAT HAVE PREVIOUSLY BEEN GRAZED CONTINUOUSLY WITH A MODERATE OR PROPER STOCKING RATE

Percent Change	Cover: Grazing Systems	Cover: Yearlong (Proper Stocking)		Adapted From
232*	Increased		Basal area of forbs and shrubs	Smoliak (1960)
0	No Change		Basal area of grasses	Smoliak (1960)
20	1,007	839	- Litter, lbs/ac.	Reardon & Merrill (1976)
160	+1.3	+5	- Plant cover in wet bottom	Johnson (1965)
50	+6	+4	- Plant cover in grassland	Johnson (1965)
-44	-3.6	-2.5	- Percent of ground covered by live vegetation	Klipple (1964)
-8	-8.1	-7.5	- Change in basal area	Lodge (1963)

Average: 30

* Treated as outlyers

Source: References cited above

Pasture Capacity Level Alternative

Assumptions

In the Pasture Capacity Level Alternative grazing use would be reduced even further than in the Proposed Action. Utilization would be reduced from a moderate (40 to 60 percent) to a light (20 to 40 percent) level.

1. Table A-14, p. A-52, shows that vegetal production should increase by 22 percent when livestock use is reduced from a moderate to light level. The 22 percent is an overall average for the western states and is used because no site specific research is available.

2. Table A-15, p. A-52, shows that cover should increase by 14 percent when livestock use is reduced from moderate to light. This analysis expects the percentage response in density to approximate the percentage response of cover because density is considered to represent the live vegetation component of cover. The 14 percent is an overall average for the western states and is used because no site specific research is available.

TABLE A-14

VEGETATIVE PRODUCTION WHEN LIVESTOCK USE WAS REDUCED FROM MODERATE TO LIGHT

Percent Change	Moderate Grazing (40-60% Use) (lbs./acre)	Light Grazing (20-40% Use) (lbs./acre)	Comments	Adapted From
16	1,409	1,636	Mid-grasses	Klipple and Bement (1961)
48	1,454	2,157	Mid-grasses	Klipple and Bement (1961)
57*	1,245	1,963	Short grass	Klipple and Bement (1961)
11	591	657	Blue grama	Klipple and Bement (1961)
99*	122	243	Mid-grasses	Klipple and Bement (1961)
10	740	815	Mid-grasses	Klipple and Bement (1961)
0*	No difference in herbage production		Mid-grasses	Klipple and Bement (1961)
22	.74	.90	Grams/Plant	Pond (1957)
74*	1.48	2.58	Grams/Plant	Pond (1957)
67*	561	937		Hanson et al (1970)
30	1,571	2,046		Johnson et al (1951)
22	1,517	1,844		Johnson et al (1951)
40	1,637	2,299		Johnson et al (1951)
19	1,353	1,605		Lewis et al (1956)
5	318	335		Smith, D. (1967)
24	3,611	446		Smith, D. (1967)
Average: 22				

* Treated as outlyers

Source: References cited above

TABLE A-15

COVER VALUES WHEN GRAZING IS REDUCED FROM MODERATE TO LIGHT USE

Density and Cover % Change	Cover: Moderate Grazing (40-60% Use)	Cover: Light Grazing (20-40% Use)	Comments	Adapted From
-15*	13.6	11.5	% Reduction Crown Cover	Cook and Stoddart (1963)
-67*	25.1	8.4	% Reduction Crown Cover	Cook and Stoddart (1963)
17	5.3	6.2	Basal Area CM^2	Pond (1957)
47	6.8	10.0	Basal Area CM^2	Pond (1957)
80*	1,531.0	2,763.0	Litter	Hanson et al (1970)
-14	2.8	2.4	Blue grama /1	Smoliak et al (1972)
8	1.2	1.3	Needle and Thread /1	Smoliak et al (1972)
42	1.2	1.7	Western Wheatgrass /1	Smoliak et al (1972)
7	1.5	1.6	Other grasses /1	Smoliak et al (1972)
-38*	0.8	0.5	Sedge /1	Smoliak et al (1972)
-22	0.9	0.7	Forbs and Browse /1	Smoliak et al (1972)
-28*	22.6	18.7	Club Moss /1	Smoliak et al (1972)
11	35.0	39.0	Decreasers /2	Johnson et al (1951)
- 7	61.0	57.0	Increasers /2	Johnson et al (1951)
0	4.0	4.0	Invaders /2	Johnson et al (1951)
81*	311.0	562.0	Standing dead /3	Lewis et al (1956)
116*	371.0	801.0	Mulch /3	Lewis et al (1956)
46	2,012.0	2,944.0	Total Cover /3 .	Lewis et al (1956)
Average: 14				

* Treated as outlyer

/1 Basal Area Percent
/2 Relative Cover Percent
/3 lbs./acre

Source: References cited above

Methods

The Pasture Capacity Level Alternative would affect 51 of 79 AMP allotments. These allotments have a proposed grazing system (rest rotation, scheduled rest-best, or rotational seasonal) which calls for one or more pastures to be rested by livestock for at least one year (Appendix 1, Figure A-6, p. A-17). The grazing system proposed for allotment 293 is a rest rotation, and would be affected by this alternative. This alternative does not affect allotments where deferred rotational, rotational deferment, or continuous seasonal grazing systems have been proposed. It also does not affect the non-AMP allotments. This alternative ensures that utilization of any grazed pastures in the affected allotments does not exceed 50 percent. Average utilization of all pastures on the affected allotments would fall below 40 percent. A light utilization level would be attained on these allotments.

Vegetative Production

Grazing intensity studies show that mean annual vegetative production increases by 22 percent when grazing is reduced from moderate to light (Table A-14, p. A-52). Therefore, the AUMs expected under the Pasture Capacity Level would equal 22 percent of long-term Proposed Action AUMs as grazing is reduced from moderate to light, plus long-term Proposed Action AUMs.

= (.22) (Long-Term Proposed Action AUMs) + (Long-Term Proposed Action AUMs).

Example:

Allotment 293
Long-term Proposed Action AUMs = 8,286 (Table A-18, p. A-58)

Long-Term Pasture Capacity Level AUMs = (.22) (8,286) + 8,286
= 10,109 (Table A-18, p. A-58)

Cover

Density and cover values were calculated for range sites by vegetative type and MLRA (Table 2-2). Each value is a weighted average for the total area of a range site by vegetative type and MLRA. The increases in density and cover under the Pasture Capacity Level Alternative would only occur on the allotments with rest rotation, rest best, and rotation seasonal grazing systems.

Grazing system studies show that mean cover increase by 14 percent when grazing is reduced from moderate to light (Table A-15, p. A-52). Therefore, the density expected under the Pasture Capacity Level Alternative in the long term

= Long-Term Proposed Action Density + [(The expected increase in density as grazing goes from moderate to light)·(Long-Term Proposed Action Density) (Acreage affected)]

Example:

For the Sandy Range Site, Desert Shrub Vegetative Type, SD-MLRA, Table 2-2

Long-term Proposed Action Density	= .14 (Table 2-2)
Expected Increase in Density as Grazing Goes from Moderate to Light	= .14 (Table A-15, p. A-52)
Total ES Acreage	= 1,318,147 (Table 1-1)
Rest Rotation, Rest Best, and Rotational Seasonal Acreage	= 1,060,534 (Table 1-1)

Long-Term Pasture Capacity Level Density = (.14) + [(.14)(.14)(1,060,534/1,318,147)]
= (.14) + (.14)(.14)(.80)
= .156 or 16 percent (Table 2-2)

Cover expected under the Pasture Capacity Level Alternative in the long term is calculated using the same formula, except the term cover is substituted for the term density.

Enhancement of Sensitive Resource Values Alternative

Assumptions

The Enhancement of Sensitive Resource Values Alternative would limit utilization of grazed pastures to 50 percent during any given year. Average utilization of all pastures on the affected allotments would fall below 40 percent. Additional livestock reductions would also be made on the basis of:

1. poor range condition, and/or critical or severe erosion condition;
2. riparian areas for wildlife habitat;
3. VRM Class I Areas (allotments: 006, 039, 052, 059, 077, and 086) and VRM Class II Areas (allotments: 129, 152, 277, and 293) (Table 1-6);
4. wild horse home range; and,
5. susceptibility of deep sand soil to erosion.

Methods

This alternative only changes the predictions for density and cover on AMP allotments. Predictions for density and cover on non-AMP allotments would remain the same as under the Proposed Action. This is a complex alternative. Parts of an affected allotment would be responding to the "No Grazing," "Pasture Capacity Level," and/or the "Proposed Action" treatment. It is assumed that all range sites within an affected allotment would respond similarly. Allotment 293 is affected by this alternative. The proposed grazing system for this allotment is a rest rotation and was affected by the Pasture Capacity Level Alternative. Under this alternative use would be eliminated from Pasture 3B to protect the Scenic Soaptree Yucca Area. A total deduction of 570 AUMs would result as shown on Table 1-6. Formula b) below was used to calculate the response allotment 293 is going to have to this alternative. The response to this alternative by other affected allotments would be calculated by one of the formulas shown below.

Vegetative Production

Production for those allotments affected by this alternative (the total vegetative AUMs) would be the additional response from the "No Grazing" acreage plus either the "Pasture Capacity Level" or the "Proposed Action" responses as shown below:

a) In allotments where grazing is eliminated, vegetative production response to No Grazing treatment in AUMs
$= C + (C).5$

b) In allotments affected by the Pasture Capacity Level Alternative and receiving additional reductions, vegetative production response to Pasture Capacity Level treatment in AUMs
$= [C + C(.5)] + [F + F(.22)]$

c) In allotments not affected by the Pasture Capacity Level Alternative but having reductions, vegetative production response to the Proposed Action treatment in AUMs
$= [C + C(.5)] + F$

Where

C = (Percent of Acreage Affected)(Long-Term Proposed Action AUMs - Range Survey AUMs)(Predicted Percentage Increase when Livestock Use is Reduced from Heavy to Moderate) + (Range Survey AUMs of the Affected Acreage)

.5 = Vegetative production increase expected when livestock grazing is reduced from moderate to No Grazing (Table A-16, p. A-57)

F = [(1)-(Percent of Acreage Affected)] (Long-Term Proposed Action AUMs - Range Survey AUMs) + (Range Survey AUMs) - (Range Survey AUMs of the Affected Acreage)

.22 = Vegetative production increase expected when livestock grazing is reduced from moderate to light

.74 = Predicted percentage increase when livestock use is reduced from heavy to moderate

Example:

Allotment 293 using the Pasture Capacity Level formula, b, above:

Range Survey AUMs = 6,267 (Table A-18, p. A-58)
Range Survey AUMs of Acreage Affected by "No Grazing" Treatment = 570 (Table 1-6)
Long-Term Proposed Action AUMs = 8,286 (Table A-18, p. A-58)
Percent of Acreage Affected = Acreage Pasture 3B divided by Total Acreage for the Allotment equals 3,462 divided by 42,901 equals 8%
Grazing System is a Rest-rotation

Long-Term Enhancement of Sensitive Resource Values AUMs = [C+C(.5)] + [F+F(.22)]

Where:

C = (.08)(8,286-6,267)(.74) + 570
= 689.5

F = (.92)(8,286-6,267) + (6,267-570)
= 7,554.5

Long-Term Enhancement of Sensitive Resource Values AUMs = [689.5 + 689.5(.5)] + [7,554.5 + 7,554.5(.22)]
= 1,034.25 + 9,216.49
= 10,250.74 or 10,251 (Table A-18, p. A-58)

Cover

Because the differences are unmeasurable, density and cover values for this alternative are the same as those calculated for the Pasture Capacity Level Alternative (Table 2-2).

No Grazing Alternative

Assumptions

Three assumptions are needed before the No Grazing Alternative can be analyzed: 1) This alternative would eliminate all livestock grazing on public lands; 2) The vegetal response predicted in the Proposed Action is equally distributed over the "treatment area" regardless of range site patterns; and 3) Livestock use on non-public land would not be changed from existing grazing preference. Vegetative production is expected to increase by 50 percent when livestock grazing is reduced from moderate to non-use (Table A-17, p. A-57). Density and cover would increase by 24 percent if the site were completely protected from livestock grazing (Table A-17, p. A-57). This analysis expects the percentage response in density to approximate the percentage response of cover because density is considered to represent the live vegetation component of cover. The 50- and 24-percent figures are overall averages for the western states and are used because no site specific research is available. There would be a 125-percent increase in vegetative production when livestock use is reduced from heavy to no grazing.

Methods

The predicted increase would only occur on public acreage; no change is predicted for non-public acreage. Allotment 293 is used as an example for calculating vegetative responses under the No Grazing Alternative.

Vegetative Production

The vegetative AUMs expected under the No Grazing Alternative in the long term is shown below:

Total AUMs = (Range Survey Non-Public Land AUMs) + (Public Land Livestock Adjustment AUMs) (Expected Increase in Production when Use is Reduced from Moderate to None) + (Public Land Livestock Adjustment AUMs).

Where

Public Land Livestock Adjustment AUMs = (Percent Public Acreage)(Long-Term Proposed Action AUMs - Range Survey AUMs) (Predicted Percentage Increase Due to Livestock Use Being Reduced from Heavy to Moderate) + (Range Survey, Public Land AUMs).

.74 = the predicted percentage increase due to livestock use being reduced from heavy to moderate.

.50 = The expected increase in production when use is reduced from moderate to none.

For example:

Range Survey AUMs	= 6,267 (Table A-18, p. A-58)
Range Survey Public Land AUMs	= 5,431 (Figure A-4, p. A-14)
Range Survey Non-Public Land AUMs	= 836 (Figure A-4, p. A-14)
Total Acreage	= 42,901 (Table A-1, p. A-4)
Public Acreage	= 37,425 (Table A-1, p. A-4)
Long-Term Proposed Action AUMs	= 8,286 (Table A-18, p. A-58)

Public Land Livestock Adjustment AUMs = 37,425/42,901 (8,286 - 6,267) (.74) + 5,431
= 6,730.83

Total AUM Production = 836 + (6,730.83) (.5) + 6,730.83
= 10,932 (Table A-18, p. A-58)

Cover

Density and cover values were calculated for range sites by vegetative type and MLRA (Table 2-2). The increases in density and cover under the No Grazing Alternative would only occur on the public land. However the figure shown (Table 2-2) is a weighted average of public and non-public land by range site, vegetative type, and MLRA.

Grazing intensity studies show that mean cover increases 24 percent when grazing is reduced from moderate to non-use (Table A-17, p. A-57); therefore, the density expected under the No Grazing Alternative in the long term

= (Percent Public Land) [Long-Term Livestock Adjustment Alternative Density + .24 (Long-Term Livestock Adjustment Alternative Density)] + (Percent Non-Public Lands)(Range Survey Density)

Example:

Sandy Range Site, Desert Shrub Vegetative Type, SD-MLRA (Table 2-2).

Public Land in Range Site = 27,937 (Table 2-2)
Total Land in Range Site = 41,298 (Table 2-2)
Long-Term Density Livestock Adjustment Alternative = .1313 (Table 2-2)
Range Survey Density = .11 (Table 2-2)
No Grazing Density = (27,937/41,298) [.1313 + .24(.1313)] + (1 - 27,937/41,298)(.11)
= .1457 or .15 (Table 2-2)

Cover under the No Grazing Alternative in the long term is calculated using the same formula, except the term cover is substituted for the term density.

TABLE A-16

VEGETATIVE PROOUCTION WHEN LIVESTOCK ARE REMOVEO FROM A PREVIOUSLY MODERATELY GRAZEO RANGE

Percent Change	Vegetative Production (lbs./ac.) Moderate Grazing	No Grazing	Comments	Adapted From
-9*	1,149.00	1,041.00	Texas	Reardon and Merrill (1976)
180*	0.74**	2.07**	Wyoming	Pond (1957)
41	1.48**	2.09**	Wyoming	Pond (1957)
19	470.00	560.00	Stony Hills	Pieper (1968)
18	550.00	650.00	Loamy Upland	Pieper (1968)
107	295.00	610.00	Loamy Bottomland	Pieper (1968)
44	287.00	413.00	Arizona	Schmutz, Michaels, and Judd (1967)
-13*	3,239.00	2,828.00	Central Louisiana	Ouvall and Linnartz (1967)
-17*	400.00	331.00	Open Grassland	Smith (1967)
-2	337.00	331.00	Open Timber	Smith (1967)
115	20.00**	43.00**	Utah	Julander (1968)
38	33.00**	52.00**	Utah	Julander (1968)
33	21.00**	28.00**	Utah	Julander (1968)
38	1,117.00	1,622.00	Colorado	Schwan et al (1949)

Average: 50

*Treated as outlyers

**Grams per plant

Source: References cited above.

TABLE A-17

COVER VALUES WHEN LIVESTOCK ARE REMOVEO FROM A PREVIOUSLY MOOERATELY GRAZEO RANGE

Percent Change	Cover (Percent) Moderate Grazing	No Grazing	Comments	Adapted From
27	44.5	56.5	Wyoming	Pond (1961)
22	4.5	5.5	Wyoming	Pond (1961)
-8	77.0	71.0	Wyoming	Pond (1961)
36	11.0	15.0	Wyoming	Pond (1961)
10	75.5	83.2	Wyoming	Pond (1961)
57	7.5	11.8	Wyoming	Pond (1961)
-43*	10.5	6.0	Wyoming	Marquiss and Lang (1969)
-31*	7.0	4.8	Wyoming	Marquiss and Lang (1969)
9	21.5	23.5	Arizona	Schmutz, Michaels, and Judd (1967)
-150*	-8.0	-20.0	Ground Cover Live Veg.	Ouvall and Linnartz (1967)
100	-9.0	0	Ground Cover Index	Turner (1971)
25	18.8	23.5	Mesa	Canfield (1948)
27	14.6	18.5	Foothill	Canfield (1948)
54	7.2	11.1	New Mexico	Potter and Krenetsky (1967)
-45*	26.4	14.4	Ridgeline	Tomanek and Albertson (1951)
-58*	33.0	14.0	Hillside	Tomanek and Albertson (1951)
-12	62.6	55.2	Stony Hill	Pieper (1968)
-5	78.1	74.4	Loamy Bottomland	Pieper (1968)
-2	72.4	71.3	Loamy Upland	Pieper (1968)

Average: 24

*Treated as outlyers

Source: References cited above.

TABLE A-18

VEGETATIVE AUMs IN THE LONG TERM

Allot. No.	Range Survey EE	PA	NA/FE	LA	PCL	ESR	NG	P***
AMPs								
002	3,081	3,561	3,081	3,436	4,344	4,378	3,703	12,491
006	1,584	2,173	1,584	2,020	2,651	2,651	2,770	5,062
012	197	231	197	222	231	231	287	959
016	3,117	4,459	3,117	4,110	5,440	5,457	4,595	9,855
036	877	1,029	1,029	1,029	1,255	1,289	1,478	1,671
037	1,414	1,632	1,414	1,575	1,991	1,991	2,211	5,394
052	117	263	117	225	263	263	492	570
058	550	630	630	630	630	630	837	1,762
059	2,020	5,032	5,032	5,032	6,139	6,139	4,829	16,461
065	3,003	3,505	3,505	3,505	4,276	4,276	3,744	10,711
077	247	281	281	281	343	364	352	1,432
081	795	1,040	1,040	1,040	1,269	1,269	1,431	1,115
083	67	67	67	67	67	67	101	226
086	2,774	3,683	2,774	3,447	4,493	4,493	4,440	11,632
089	45	59	45	55	59	59	64	294
090	1,210	1,805	1,210	1,650	2,202	2,235	2,045	5,746
091	490	686	686	686	837	837	948	1,054
114	5,346	6,710	5,346	6,355	8,186	8,196	6,853	16,619
121	812	1,250	1,250	1,250	1,250	1,250	1,510	3,687
122	367	454	454	454	454	540	513	720
129	7,299	9,719	9,719	9,719	11,857	12,399	10,340	27,051
131	872	1,268	872	1,165	1,547	1,547	1,143	3,724
152	3,019	4,152	3,019	3,857	5,065	5,065	4,015	11,401
250	714	783	714	765	955	1,035	1,026	1,518
251	2,517	3,866	2,517	3,515	4,717	4,717	3,702	5,901
252	1,901	2,659	1,901	2,462	3,244	3,248	3,388	3,659
253	238	388	388	388	388	424	524	587
254	2,504	3,217	3,217	3,217	3,217	4,305	4,200	4,098
255	319	435	435	435	435	653	541	925
256	1,576	2,129	2,129	2,129	2,597	2,605	2,697	5,412
258	1,009	1,241	1,009	1,241	1,514	1,659	1,657	1,814
260	1,823	2,780	1,823	2,531	3,392	3,447	3,165	3,165
261	2,235	2,430	2,430	2,430	2,965	3,441	3,089	2,433
262	2,313	2,992	2,313	2,815	3,650	3,810	3,325	3,557
263	2,564	3,313	2,564	3,118	3,313	3,313	3,895	8,084
264	1,389	1,809	1,389	1,700	1,809	1,896	2,318	1,953
266	1,397	2,085	1,397	1,906	2,544	2,544	2,625	2,097
268	4,434	8,564	4,434	7,490	10,448	10,465	9,399	17,674
271	2,955	3,555	2,955	3,399	4,337	4,337	4,177	6,210
272	4,259	5,228	4,259	4,976	6,378	6,378	6,823	4,080
275	8,163	11,773	8,163	10,834	14,363	14,491	11,722	25,884
276	324	452	324	419	452	452	559	594
277	1,896	2,364	1,896	2,242	2,884	3,179	2,821	2,283
279	1,500	1,598	1,598	1,598	1,950	2,012	2,050	1,940
280	1,857	3,078	1,857	2,761	3,755	3,755	3,570	3,240
283	2,319	2,851	2,851	2,851	3,478	3,478	3,562	3,842
284	1,158	1,563	1,158	1,458	1,907	1,907	1,934	3,651
285	2,753	3,831	2,753	3,551	3,831	4,482	4,760	5,132
287	307	458	458	458	559	569	577	684
288	275	313	313	313	382	421	428	510
289	1,601	2,552	2,552	2,552	3,113	3,113	2,996	4,457
290	2,564	3,760	2,564	3,449	3,760	3,760	5,316	7,632
291	1,253	1,950	1,253	1,769	2,379	2,379	2,521	2,112
293	6,267	8,286	6,267	7,761	10,109	10,251	10,932	9,189
294	1,411	1,530	1,411	1,499	1,530	1,870	1,644	3,780
295	1,672	1,861	1,672	1,812	1,861	1,861	2,101	4,084
297	878	1,647	1,647	1,647	2,009	2,021	1,809	3,994
298	831	1,177	831	1,087	1,436	1,436	1,149	1,945
299	686	776	686	753	947	947	1,076	1,128
300	782	1,042	1,042	1,042	1,271	1,271	1,080	763
301	3,924	5,682	3,924	5,225	6,932	6,932	6,076	10,032
303	80	127	80	115	127	127	173	157
306	326	342	326	338	342	342	476	554
308	193	227	193	218	277	299	310	492
312	426	667	667	667	814	907	907	1,691
315	280	629	280	538	629	807	707	711
317	212	273	273	273	273	386	361	443
318	340	392	392	392	478	490	551	562
321	965	1,470	965	1,339	1,793	1,793	1,726	4,396
322	2,363	3,023	2,363	2,851	3,688	3,774	3,550	2,951
323	2,261	3,135	2,261	2,908	3,135	3,180	3,349	5,916
325	1,687	2,386	1,687	2,204	2,911	2,918	2,697	4,946
327	1,111	1,614	1,111	1,483	1,969	1,989	1,646	2,569

TABLE A-18 (continued)

VEGETATIVE AUMs IN THE LONG TERM

Allot. No.	Range Survey EE	PA	NA/FE	LA	PCL	ESR	NG	P***
AMPs (continued)								
328	1,062	1,794	1,062	1,604	1,794	1,794	1,976	3,620
330	1,020	1,484	1,020	1,363	1,484	1,484	1,413	2,119
347	23	41	23	36	41	41	48	67
348	160	308	160	270	308	308	388	522
349	89	208	89	177	208	208	266	227
360	650	781	650	747	781	781	932	979
TOTAL	129,119	178,608	141,165	168,931	210,712	216,118	205,411	345,733
(Percent Increase)		(38%)	(9%)	(31%)	(63%)	(67%)	(59%)	
NON-AMPs								
017	264	*	*	*	*	*	594	909
113	19	*	*	*	*	43	43	57
134	79	*	*	*	*	*	178	476
143	13	*	*	*	*	*	29	72
145	347	*	*	*	*	*	781	1,835
165	9	*	*	*	*	*	20	37
267	342	*	*	*	*	*	770	920
281	942	*	*	*	*	*	2,120	2,250
282	54	*	*	*	*	*	122	216
296	866	*	*	*	*	*	1,299	1,050
310	152	*	*	*	*	*	342	394
340	262	*	*	*	*	*	393	495
341	11	*	*	*	*	*	17	23
342	234	*	*	*	*	*	351	363
343	154	*	*	*	*	*	347	424
345	144	*	*	*	*	*	324	386
350	225	*	*	*	*	*	338	268
351	155	*	*	*	*	*	349	644
352	452	*	*	*	*	*	678	871
353	140	*	*	*	*	*	315	341
354	13	*	*	*	*	*	29	32
355	450	*	*	*	*	*	675	685
356	86	*	*	*	*	*	129	175
358	322	*	*	*	*	*	483	637
361	35	*	*	*	*	*	79	192
362	8	*	*	*	*		18	37
TOTAL	5,778	*	*	*	*	5,802	10,823	13,789
ELIMINATION OF GRAZING								
286	2	5	*	**	**	**	**	33
302	1	2	*	**	**	**	**	33
311	1	2	*	**	**	**	**	7
357	38	86	*	**	**	**	**	283
TOTAL	42	95	*	**	**	**	**	356
UNALLOTTED AREAS								
164	3	7	*	**	**	**	**	46
363	0	0	*	**	**	**	**	0
TOTAL	3	7	*	**	**	**	**	46
TOTAL FOR ES AREA								
	134,942	184,488	146,988	174,811	216,592	221,920	216,336	359,924
(Percent Increase)		(37%)	(9%)	(30%)	(61%)	(64%)	(60%)	(167%)

* Same as Existing Environment ** Same as Proposed Action

EE - Existing Environment
NA/FE - No Action Alternative and Future Environment
PA - Proposed Action
LA - Livestock Adjustment Alternative
PCL - Pasture Capacity Level Alternative
ESR - Enhancement of Sensitive Resource Values Alternative
NG - No Grazing Alternative
***P - Potential (The Ultimate Production Ever Expected)

Source: Range Survey, Socorro County Soil Survey and Vegetation Methodologies, Socorro District

APPENDIX 3

SOILS

TABLE A-19

SOILS AND RANGE SITES BY ALLOTMENT

ALLOT.	RANGE SITE, MLRA, SOIL MAPPING UNIT	ACRES* PUBLIC	OTHER	TOTAL
AMPs				
002	Deep Sand SD			
	620	4,003	8,667	12,670
	Gravelly WP-3			
	441	637	1,319	1,956
	Hills CP			
	785	976	1,642	2,618
	Igneous Hills SD			
	689	597	1,296	1,893
	Limestone Hills WP-2,3			
	432	25	640	665
	482	128	793	921
	Loamy WP-2,3			
	418	505	1,770	2,275
	419	2,084	4,953	7,037
	431	310	661	971
	446	72	94	166
	SD			
	648	160	484	644
	653	209	409	618
	Malpais WP-2			
	405	1,335	1,886	3,221
	SD			
	657	391	722	1,113
	Sandstone Hills WP-2			
	483	1,677	3,603	5,280
	Sandy WP-2			
	455	41	210	251
	WP-3			
	422	50	320	370
	SD			
	624	282	1,201	1,483
	Shallow Sandstone WP-2			
	434	45	1,577	1,622
	No Range Site			
	485	1,043	1,697	2,740
006	Gravelly WP-3			
	440	393	0	393
	449	798	377	1,175
	Hills CP			
	785	230	4	234
	Limestone Hills WP-2			
	482	1,967	322	2,289
	WP-3			
	432	3,443	674	4,117
	CP			
	781	231	21	252
	Loamy WP-3			
	419	411	275	686
	446	2,410	309	2,719
	Shallow WP-3			
	439	197	61	258
	490	760	0	760
	Shallow Sandstone WP-2			
	434	396	380	776
012	Hills CP			
	785	185	436	621
	Limestone Hills WP-2			
	482	682	96	778
	Shallow WP-3			
	484	679	338	1,017
	No Range Site			
	485	20	0	20
	491	205	34	239
016	Bottomland WP-2			
	421	317	676	993
	Gypsum Hills CP			
	787	273	1,014	1,287
	Hills CP			
	785	745	707	1,452
	Limestone Hills WP-2			
	482	2,113	3,074	5,187
	WP-3			
	432	1,042	1,130	2,172
	Loamy WP-3			
	418	922	600	1,522
	419	4,255	2,740	6,995
	Sandy WP-3			
	(No Name)	244	333	577
	Shallow WP-3			
	484	923	677	1,600
	Shallow Sandstone WP-2			
	434	1,441	1,804	3,245
	No Range Site			
	491	511	1,546	2,057
036	Gravelly SD			
	652	6,240	24	6,264
	Loamy SD			
	641	979	0	979
	648	3,082	112	3,194
	Sandy SD			
	637	556	0	556
	No Range Site			
	491	1,102	1	1,103
037	Gravelly WP-3			
	440	376	211	587
	441	416	239	655
	449	1,231	510	1,741
	SD			
	652	411	1	412
	Hills CP			
	785	2,355	443	2,798
	Loamy WP-3			
	410	1,329	369	1,698
	446	2,040	0	2,040
	SD			
	625	938	143	1,081
	641	1,243	0	1,243

TABLE A-19 (continued)

SOILS AND RANGE SITES BY ALLOTMENT

ALLOT.	RANGE SITE, MLRA, SOIL MAPPING UNIT	ACRES* PUBLIC	OTHER	TOTAL
AMPs				
037 (cont.)	Shallow WP-3			
	490	1,083	133	1,216
	No Range Site			
	800	241	152	393
052	Hills CP			
	785	804	686	1,490
	Limestone Hills WP-2			
	482	571	0	571
058	Gravelly WP-3			
	441	682	293	975
	449	736	0	736
	SD			
	652	153	0	153
	Loamy WP-3			
	410	111	0	111
	SD			
	625	1,654	665	2,319
	Sandy SD			
	624	254	0	254
059	Bottomland WP-2			
	421	524	303	827
	Gravelly WP-3			
	441	8,622	6,517	15,139
	449	1,179	123	1,302
	Hills CP			
	785	3,303	512	3,815
	Limestone Hills WP-2			
	482	1,908	205	2,113
	Loamy WP-3			
	410	83	551	634
	445	0	751	751
	Shallow WP-3			
	439	321	0	321
	484	1,700	347	2,047
	No Range Site			
	491	389	353	742
065	Basalt Hills WP-2			
	484	130	140	270
	Bottomland WP-2			
	420	92	337	429
	Gravelly WP-3			
	441	0	348	348
	Limestone Hills WP-2			
	432	901	2,376	3,277
	482	281	540	821
	Loamy WP-2,3			
	418	437	252	689
	419	652	1,624	2,276
	446	1,788	3,485	5,273
	Malpais WP-2			
	405	2,105	3,648	5,753
	406	1,432	2,933	4,365
065 (cont.)	Sandstone Hills WP-2			
	483	397	239	636
	Shallow Sandstone WP-2			
	434	2,582	3,128	5,710
	No Range Site			
	485	1,107	2,053	3,160
077	Gravelly WP-3			
	441	502	174	676
	449	154	0	154
	SD			
	652	140	539	679
	Hills CP			
	785	1,539	1,051	2,590
	No Range Site			
	800	1,881	460	2,341
081	Gravelly WP-3			
	449	70	80	150
	SD			
	652	2,427	109	2,536
	Loamy SD			
	625	1,648	61	1,709
	641	1,415	0	1,415
	Sandy SD			
	624	148	0	148
	No Range Site			
	491	160	0	160
083	Loamy WP-2			
	419	164	0	164
	Sandy WP-2			
	422	195	0	195
	455	275	0	275
086	Gravelly WP-3			
	440	1,864	71	1,935
	449	3,614	235	3,849
	Hills CP			
	785	2,215	147	2,362
	Limestone Hills WP-2			
	482	5,450	506	5,956
	WP-3			
	432	1,386	1,382	2,768
	CP			
	732	87	489	576
	781	137	0	137
	Loamy WP-3			
	410	1,476	53	1,529
	418	519	378	897
	Shallow WP-3			
	431	1,685	45	1,730
	439	3,601	569	4,170
	484	1,158	0	1,158
	Shallow Sandstone WP-2			
	434	104	89	193
	No Range Site			
	800	186	0	186

TABLE A-19 (continued)

SOILS AND RANGE SITES BY ALLOTMENT

ALLOT.	RANGE SITE, MLRA, SOIL MAPPING UNIT	ACRES* PUBLIC	ACRES* OTHER	ACRES* TOTAL
AMPs				
089	Sandy WP-3			
	455	269	220	489
090	Bottomland WP-3			
	420	112	237	349
	Gravelly WP-3			
	441	797	0	797
	Loamy WP-2,3			
	419	3,851	2,035	5,886
	Malpais WP-2			
	405	250	312	562
	406	715	791	1,506
	Sandstone Hills WP-2			
	483	180	10	190
	Sandy WP-2,3			
	422	0	147	147
	455	3,109	1,208	4,317
091	Gravelly WP-3			
	441	131	0	131
	SD			
	652	4,341	42	4,383
	Loamy SD			
	641	2,342	24	2,366
	No Range Site			
	491	486	14	500
114	Basalt Hills WP-2			
	484	761	1,596	2,357
	Bottomland WP-2			
	420	326	709	1,035
	Limestone Hills WP-2			
	432	478	726	1,204
	482	411	819	1,230
	Loamy WP-2			
	410	34	173	207
	418	55	140	195
	419	1,509	4,254	5,763
	446	1,963	2,279	4,242
	Malpais WP-2			
	405	4,509	7,000	11,509
	406	4,534	5,945	10,479
	Sandstone Hills WP-2			
	482	108	526	634
	Sandy WP-2			
	455	80	324	404
	Shallow WP-2			
	431	282	969	1,251
	Shallow Sandstone WP-2			
	434	254	330	584
	No Range Site			
	485	1,615	3,615	5,230
121	Gypsum Hills CP			
	787	512	105	617
121	Hills CP			
(cont.)	785	512	0	512
	Limestone Hills WP-2			
	482	3,363	144	3,507
	Shallow WP-3			
	431	109	0	109
	484	2,874	1,727	4,601
	No Range Site			
	491	137	145	282
122	Gravelly SD			
	652	2,116	636	2,752
	Loamy SD			
	648	181	0	181
	No Range Site			
	491	103	9	112
129	Basalt Hills WP-2			
	484	879	502	1,381
	Bottomland WP-2,3			
	420	1,326	1,501	2,827
	Gypsum Flats WP-2			
	476	107	222	329
	Loamy WP-2,3			
	410	324	513	837
	419	9,179	11,317	20,496
	Malpais WP-2			
	405	2,037	1,405	3,442
	406	11,527	13,446	24,973
	Sandstone Hills WP-2			
	483	2,410	295	2,705
	Sandy WP-2,3			
	422	34	77	111
	455	2,098	6,251	8,349
	Shallow Sandstone WP-2			
	434	0	107	107
	No Range Site			
	485	4,629	2,143	6,772
131	Limestone Hills WP-2			
	432	883	1,638	2,521
	482	152	118	270
	Loamy WP-2,3			
	418	1,343	2,064	3,407
	419	333	2,476	2,809
	446	430	690	1,120
	Sandstone Hills WP-2			
	483	213	101	314
	Shallow WP-2			
	431	0	301	301
	Shallow Sandstone WP-2			
	434	25	160	185
152	Basalt Hills WP-2			
	484	727	667	1,394

TABLE A-19 (continued)

SOILS AND RANGE SITES BY ALLOTMENT

ALLOT.	RANGE SITE, MLRA, SOIL MAPPING UNIT	ACRES* PUBLIC	OTHER	TOTAL
AMPs				
152 (cont.)	Bottomland WP-2			
	420	256	743	999
	Limestone Hills WP-2			
	432	1,550	1,532	3,082
	482	153	152	305
	Loamy WP-2			
	419	1,308	4,589	5,897
	446	129	22	151
	Malpais WP-2			
	405	650	1,626	2,276
	406	5,019	6,074	11,093
	Sandstone Hills WP-2			
	483	128	428	556
	Shallow Sandstone WP-2			
	434	701	2,174	2,875
	No Range Site			
	485	876	2,497	3,373
250	Gravelly SD			
	622	383	0	383
	649	5,495	1,370	6,865
	652	4,210	1,210	5,420
	655	2,517	960	3,477
	No Range Site			
	491	344	1,409	1,753
251	Bottomland CP			
	724	614	999	1,613
	Limestone Hills CP			
	723	0	139	139
	731	585	426	1,011
	732	299	463	762
	Loamy SD			
	636	297	875	1,172
	641	456	0	456
	CP			
	710	93	935	1,028
	735	1,159	1,573	2,732
	737	123	692	815
	Sandy SD			
	624	0	206	206
	627	1,405	405	1,810
	CP			
	717	1,052	1,736	2,788
	752	521	558	1,079
	756	480	218	698
	Shallow CP			
	783	58	50	108
252	Bottomland SD			
	651	241	0	241
	Gravelly SD			
	649	2,002	345	2,347
	CP			
	749	639	10	649
	Hills CP			
	785	2,709	1,800	4,509

ALLOT.	RANGE SITE, MLRA, SOIL MAPPING UNIT	ACRES* PUBLIC	OTHER	TOTAL
252 (cont.)	Limestone Hills SD			
	634	4,081	453	4,534
	Sandy SD			
	627	4,365	118	4,483
	629	3,548	919	4,467
253	Deep Sand SD			
	620	693	5	698
	Gravelly SD			
	652	594	0	594
	Sandy SD			
	632	1,824	0	1,824
254	Gravelly CP			
	749	1,815	926	2,741
	Gypsum CP			
	736	2,644	464	3,108
	Gypsum Hills CP			
	787	3,814	537	4,351
	Hills CP			
	785	266	27	293
	Limestone Hills SD			
	634	1,956	31	1,987
	CP			
	732	8,842	1,348	10,190
	Loamy CP			
	719	934	696	1,630
	737	617	246	863
255	Deep Sand SD			
	620	598	757	1,355
	Hills CP			
	785	2,350	528	2,878
	Sandy SD			
	632	1,731	119	1,850
256	Bottomland SD			
	651	3,243	259	3,502
	Gravelly SD			
	649	692	37	729
	Hills CP			
	785	1,259	810	2,069
	Limestone Hills SD			
	634	345	194	539
	Sandy SD			
	624	1,004	356	1,360
	629	4,807	587	5,394
	632	768	414	1,182
	645	564	368	932
258	Gravelly SD			
	649	2,988	407	3,395
	650	2,759	106	2,865
	Hills CP			
	785	1,394	155	1,549
	Igneous Hills SD			
	689	201	215	416

TABLE A-19 (continued)

SOILS AND RANGE SITES BY ALLOTMENT

ALLOT.	RANGE SITE, MLRA, SOIL MAPPING UNIT	ACRES* PUBLIC	ACRES* OTHER	ACRES* TOTAL
AMPs				
258 (cont.)	Limestone Hills SD			
	634	2,831	589	3,420
	Sandy SD			
	632	743	483	1,226
260	Bottomland CP			
	724	262	98	360
	Gypsum CP			
	736	2,232	1,823	4,055
	Gypsum Hills CP			
	787	3,691	1,247	4,938
	Hills CP			
	786	216	181	397
	Limestone Hills CP			
	723	155	0	155
	732	3,060	275	3,335
	Loamy SD			
	641	19	253	272
	CP			
	710	688	1,487	2,175
	735	936	0	936
	737	1,072	534	1,606
	Sandy SD			
	627	111	0	111
261	Gravelly SD			
	649	7,580	1,293	8,873
	652	3,756	839	4,595
	655	6,422	2,286	8,708
	Loamy WP-3			
	445	58	915	973
	No Range Site			
	491	1,328	5,439	6,767
262	Gypsum CP			
	736	1,281	584	1,865
	Hills CP			
	785	2,200	1,648	3,848
	Limestone Hills SD			
	634	4,743	5,125	9,868
	CP			
	731	350	11	361
	781	78	239	317
	Loamy CP			
	719	3	253	256
	737	388	158	546
263	Basalt Hills WP-3			
	406	2,417	1,508	3,925
	Gravelly WP-3			
	449	779	218	997
	451	530	1,959	2,489
	SD			
	649	2,292	903	3,195
	652	531	434	965
	655	514	973	1,487

ALLOT.	RANGE SITE, MLRA, SOIL MAPPING UNIT	ACRES* PUBLIC	ACRES* OTHER	ACRES* TOTAL
263 (cont.)	Hills WP-3			
	404	2,482	343	2,825
	442	837	626	1,463
	Loamy WP-3			
	421	302	24	326
	445	314	0	314
	453	1,784	24	1,808
	Malpais WP-3			
	405	208	23	231
	No Range Site			
	491	650	881	1,531
264	Gravelly CP			
	749	96	170	266
	Hills CP			
	785	2,783	562	3,345
	Igneous Hills SD			
	689	145	0	145
	Limestone Hills SD			
	634	2,854	496	3,350
	CP			
	731	338	214	552
	Loamy CP			
	716	444	122	566
	719	312	0	312
	737	1,510	517	2,027
266	Gypsum SD			
	646	1,791	636	2,427
	CP			
	736	333	0	333
	Limestone Hills CP			
	732	2,516	0	2,516
	Loamy SD			
	636	2,801	832	3,633
	653	544	43	587
	Sandy SD			
	624	327	0	327
	629	518	0	518
	No Range Site			
	687	2,264	625	2,889
268	Basalt Hills WP-3			
	406	201	178	379
	Gravelly WP-3			
	449	3,525	922	4,447
	451	368	412	780
	SD			
	649	88	26	114
	655	78	101	179
	Hills WP-3			
	404	5,029	3,298	8,327
	442	11,642	2,785	14,427
	CP			
	785	1,425	1,007	2,432
	Loamy WP-3			
	421	792	145	937

TABLE A-19 (continued)

SOILS AND RANGE SITES BY ALLOTMENT

ALLOT.	RANGE SITE, MLRA, SOIL MAPPING UNIT	ACRES* PUBLIC	OTHER	TOTAL
AMPs				
268 (cont.)	Malpais WP-3			
	405	205	185	390
	Shallow WP-3			
	459	2,978	377	3,355
	No Range Site			
	491	12	92	104
271	Bottomland CP			
	724	506	562	1,068
	Gravelly CP			
	749	159	229	388
	Gypsum CP			
	736	0	169	169
	Hills CP			
	786	910	238	1,148
	Limestone Hills CP			
	731	35	75	110
	732	265	1,165	1,430
	Loamy CP			
	710	210	651	861
	716	887	812	1,699
	719	1,424	1,069	2,493
	735	677	674	1,351
	738	962	435	1,397
	Malpais CP			
	705	2,741	1,158	3,899
	784	315	61	376
	Sandy CP			
	709	898	184	1,082
	Shallow CP			
	783	1,403	1,279	2,682
272	Deep Sand SD			
	640	384	214	598
	Limestone Hills SD			
	634	878	128	1,006
	Loamy SD			
	641	1,853	0	1,853
	Sandy SD			
	623	4,519	953	5,472
	624	776	273	1,049
	635	2,998	1,592	4,590
	637	1,608	40	1,648
275A	Bottomland CP			
	724	14	1,020	1,034
	755	453	1,023	1,476
	Gypsum CP			
	736	444	5,730	6,174
	Gypsum Hills CP			
	787	1,026	1,163	2,189
	Limestone Hills CP			
	723	206	116	322
	732	4,633	1,869	6,502
	781	48	113	161
275A (cont.)	Loamy SD			
	636	621	245	866
	CP			
	735	0	53	53
	737	173	3,073	3,246
	748	78	1,889	1,967
	Shallow CP			
	783	1,792	5,890	7,682
275H	Bottomland SD			
	651	431	71	502
	CP			
	755	1,234	3,404	4,638
	Deep Sand CP			
	640	4,189	574	4,763
	644	71	234	305
	Gravelly SD			
	649	89	399	488
	Limestone Hills SD			
	634	1,333	1,106	2,439
	Loamy SD			
	636	244	1,196	1,440
	653	391	71	462
	CP			
	737	0	434	434
	748	702	2,343	3,045
	Sandy SD			
	627	340	485	825
	629	386	2,275	2,661
	635	2,055	759	2,814
	637	1,041	322	1,363
	645	289	331	620
275P	Bottomland SD			
	651	582	245	827
	Gravelly SD			
	649	891	488	1,379
	Igneous Hills SD			
	689	865	141	1,006
	Sandy SD			
	629	4,797	1,078	5,875
276	Gypsum CP			
	736	2,083	680	2,763
	Loamy CP			
	735	196	0	196
277	Gravelly SD			
	622	860	774	1,634
	649	4,761	879	5,640
	652	5,621	2,367	7,988
	655	2,839	617	3,456
	Hills WP-3			
	442	404	213	617
	CP			
	785	335	0	335
	Igneous Hills SD			
	689	196	378	574
	No Range Site			
	491	2,046	3,041	5,087

TABLE A-19 (continued)

SOILS AND RANGE SITES BY ALLOTMENT

ALLOT.	RANGE SITE, MLRA, SOIL MAPPING UNIT	ACRES* PUBLIC	OTHER	TOTAL
AMPs				
279	Gravelly SO			
	622	1,976	440	2,416
	649	6,524	1,250	7,774
	652	2,130	874	3,004
	655	1,519	227	1,746
	Loamy WP-3			
	419	0	473	473
	445	322	160	482
	No Range Site			
	491	877	3,881	4,758
280	Gypsum CP			
	736	2,279	503	2,782
	Gypsum Hills CP			
	787	1,580	629	2,209
	Hills CP			
	785	1,602	279	1,881
	Limestone Hills SO			
	634	240	0	240
	CP			
	731	28	1,223	1,251
	732	3,420	675	4,095
	Loamy CP			
	710	484	382	866
	716	1,013	232	1,285
	719	162	0	162
	737	224	0	224
	Shallow CP			
	783	2,232	272	2,504
283	Deep Sand SO			
	640	187	5	192
	Gravelly SO			
	649	2,669	654	3,323
	CP			
	749	1,354	868	2,222
	Gypsum CP			
	736	39	398	437
	Hills CP			
	785	1,822	819	2,641
	Igneous Hills SO			
	689	2,166	795	2,961
	Limestone Hills SO			
	634	4,383	370	4,753
	Loamy SO			
	653	237	575	812
	CP			
	719	107	838	945
	737	399	609	1,008
	Sandy SO			
	624	91	36	127
	627	2,057	340	2,397
	629	310	13	323
	632	403	0	403
	No Range Site			
	687	0	150	150
284	Bottomland CP			
	724	204	29	233
	Loamy CP			
	735	142	32	174
	737	326	6	332
	Sandy CP			
	717	4,480	1,783	6,263
	752	2,594	981	3,575
	756	979	73	1,052
285	Deep Sand SO			
	640	7,372	117	7,489
	Gravelly SO			
	649	1,995	508	2,503
	652	30	198	228
	Hills CP			
	785	323	1,706	2,029
	Igneous Hills SO			
	689	306	26	332
	Sandy SO			
	623	2,617	382	2,999
	624	1,122	578	1,700
	629	558	91	649
	632	683	1,218	1,901
	635	3,870	720	4,590
	637	2,676	298	2,974
	No Range Site SO			
	660	120	43	163
287	Deep Sand SO			
	640	3	141	144
	Gravelly SO			
	649	542	0	542
	Hills CP			
	785	1,047	439	1,486
	Limestone Hills SO			
	634	2,122	0	2,122
	Sandy SO			
	632	527	220	747
288	Gravelly SO			
	649	421	0	421
	Hills CP			
	785	3,586	600	4,186
	Sandy SO			
	632	307	0	307
289	Bottomland SO			
	643	615	0	615
	651	1,759	876	2,635
	Deep Sand SO			
	644	321	78	399
	Loamy SO			
	653	103	0	103
	Sandy SO			
	629	1,693	604	2,297
	637	840	18	858
	645	2,620	1,018	3,638

TABLE A-19 (continued)

SOILS AND RANGE SITES BY ALLOTMENT

ALLOT.	RANGE SITE, MLRA, SOIL MAPPING UNIT	ACRES* PUBLIC	OTHER	TOTAL
AMPs				
290	Bottomland CP			
	724	195	190	385
	Hills WP-3			
	404	1,464	342	1,806
	442	188	499	687
	Loamy WP-3			
	431	437	24	461
	445	464	1,167	1,631
	467	4,837	2,920	7,757
291	Gravelly SD			
	649	367	43	410
	Gypsum SD			
	646	1,222	267	1,489
	Loamy SD			
	636	1,824	220	2,044
	653	1,370	2	1,372
	Sandy SD			
	624	2,425	172	2,597
	627	290	0	290
	629	292	132	424
	645	1,665	114	1,779
	No Range Site			
	687	162	10	172
293	Bottomland SD			
	643	199	33	232
	Deep Sand SD			
	640	770	0	770
	Loamy SD			
	641	428	248	676
	Malpais SD			
	657	14,357	2,067	16,424
	Sandy SD			
	623	548	0	548
	624	5,440	1,128	6,568
	635	10,253	1,519	11,772
	637	4,489	308	4,797
	645	118	123	241
	Shallow Sand SD			
	656	825	50	875
294	Gravelly WP-3			
	449	289	787	1,076
	SD			
	622	188	23	211
	649	983	319	1,302
	652	27	131	158
	655	1,103	338	1,441
	Hills WP-3			
	404	130	38	168
	442	158	187	345
	483	262	3,151	3,413
	CP			
	785	511	0	511
	Limestone Hills WP-2			
	482	199	179	378
294 (cont.)	Loamy WP-3			
	445	477	1,431	1,908
	No Range Site			
	491	130	463	593
295	Gravelly SD			
	649	3,626	2,444	6,070
	652	82	182	264
	655	2,563	4,542	7,105
	Hills WP-3			
	404	42	263	305
	442	416	865	1,281
	Loamy WP-3			
	445	1,459	3,181	4,640
	Shallow WP-3			
	459	80	257	337
	No Range Site			
	491	367	795	1,162
297	Gravelly WP-3			
	441	696	379	1,075
	449	353	51	404
	SD			
	649	5,968	2,294	8,262
	652	3,855	568	4,423
	655	0	159	159
	Hills WP-3			
	404	1,855	754	2,609
	442	230	458	688
	CP			
	785	765	391	1,156
	Limestone Hills WP-2			
	482	146	267	413
	No Range Site			
	491	618	189	807
298	Bottomland CP			
	724	147	198	345
	Gypsum CP			
	736	1,837	3,209	5,046
	Loamy CP			
	735	759	1,003	1,762
	737	92	166	258
299	Gravelly SD			
	622	566	231	797
	649	6,129	658	6,787
	652	1,270	102	1,372
	655	1,887	490	2,377
	Hills WP-3			
	442	286	5	291
	No Range Site			
	491	1,187	106	1,293
300	Gypsum Hills CP			
	787	372	98	470
	Hills CP			
	785	39	930	969

TABLE A-19 (continued)

SOILS AND RANGE SITES BY ALLOTMENT

ALLOT.	RANGE SITE, MLRA, SOIL MAPPING UNIT	ACRES* PUBLIC	OTHER	TOTAL
AMPs				
300 (cont.)	Loamy SO			
	636	180	39	219
	CP			
	719	943	505	1,448
	737	0	259	259
301	Bottomland SD			
	651	1,117	1,635	2,752
	CP			
	724	209	1,022	1,231
	Gypsum SD			
	646	2,658	1,697	4,355
	CP			
	736	1,665	2,674	4,339
	Limestone Hills CP			
	732	1,276	559	1,835
	Loamy SD			
	636	48	215	263
	CP			
	735	891	779	1,670
	Sandy SD			
	632	506	1,557	2,063
	635	1,277	1,154	2,431
	645	640	523	1,163
	CP			
	717	909	299	1,208
	752	3,669	855	4,524
	756	2,413	627	3,040
303	Sandy SD			
	629	707	0	707
306	Gravelly SD			
	649	1,031	0	1,031
	650	3,670	1,029	4,699
	Hills CP			
	785	430	0	430
308	Gravelly SD			
	622	80	130	210
	649	2,900	201	3,101
	652	1,094	267	1,361
	Hills WP-3			
	442	124	0	124
	No Range Site			
	491	597	93	690
312	Deep Sand SD			
	620	1,482	47	1,529
	Gravelly SD			
	649	376	0	376
	652	649	0	649
	Hills CP			
	785	924	0	924
	Limestone Hills SO			
	634	796	0	796
	Sandy SD			
	632	5,011	0	5,011
	No Range Site			
	491	158	0	158
315	Bottomland WP-2			
	421	106	0	106
	Gravelly SD			
	652	1,770	349	2,119
	Hills WP-3			
	404	127	36	163
	CP			
	785	1,148	394	1,542
	No Range Site			
	491	268	42	310
317	Deep Sand SD			
	620	861	155	1,016
	Gravelly SO			
	649	153	0	153
	652	1,226	33	1,259
	Sandy SD			
	632	434	0	434
	No Range Site			
	491	537	0	537
318	Gravelly SD			
	649	248	0	248
	650	4,039	155	4,194
	Hills CP			
	785	146	8	154
	Limestone Hills SD			
	634	172	0	172
	Sandy SD			
	632	560	0	560
321	Gravelly WP-3			
	449	8	718	726
	SO			
	649	239	673	912
	655	162	981	1,143
	Hills WP-3			
	404	1,190	0	1,190
	442	741	393	1,134
	Loamy WP-3			
	445	36	1,047	1,083
	453	2,853	2,518	5,371
322	Bottomland SD			
	651	429	143	572
	Gravelly SO			
	649	129	59	188
	Hills CP			
	785	4,165	2,200	6,365
	Limestone Hills SD			
	634	2,331	467	2,798
	Loamy SO			
	641	1,224	1,239	2,463
	653	1,332	66	1,398
	Sandy SO			
	627	1,091	62	1,153
	No Range Site			
	687	143	0	143

TABLE A-19 (continued)

SOILS AND RANGE SITES BY ALLOTMENT

ALLOT.	RANGE SITE, MLRA, SOIL MAPPING UNIT	ACRES* PUBLIC	OTHER	TOTAL
AMPs				
323	Basalt Hills WP-3			
	406	414	21	435
	Gravelly WP-3			
	441	386	94	480
	449	417	2	419
	Hills WP-3			
	404	2,237	1,695	3,932
	442	1,774	1,231	3,005
	CP			
	785	277	29	306
	786	132	117	249
	Limestone Hills WP-2			
	482	136	0	136
	Loamy WP-3			
	445	170	25	195
	453	1,218	2,307	3,525
	No Range Site			
	491	182	449	631
325	Bottomland SD			
	651	1,229	873	2,102
	CP			
	755	98	444	542
	Deep Sand SD			
	640	1,075	114	1,189
	644	911	21	932
	Gypsum SD			
	646	898	3	901
	Loamy SD			
	653	618	1,532	2,150
	Sandy SD			
	624	1,237	267	1,504
	629	104	514	618
	635	400	10	410
	637	1,140	478	1,618
	645	1,325	365	1,690
327	Bottomland CP			
	724	252	0	252
	Gypsum CP			
	736	2,731	3,324	6,055
	Limestone Hills SD			
	634	246	6	252
	CP			
	731	178	405	583
	732	619	941	1,560
	Loamy CP			
	710	29	408	437
	735	24	242	266
	748	427	365	792
	Sandy SD			
	632	240	186	426
	CP			
	752	700	283	983
	756	207	0	207
328	Bottomland SD			
	651	2,393	996	3,389
328 (cont.)	Loamy SD			
	653	152	73	225
	Sandy SD			
	624	307	26	333
	627	599	365	964
	629	1,039	460	1,499
330	Bottomland CP			
	724	0	184	184
	755	0	139	139
	Gypsum CP			
	736	67	1,422	1,489
	Limestone Hills SD			
	634	141	271	412
	Loamy CP			
	735	495	394	889
	737	3	222	225
	748	222	589	811
	Sandy SD			
	629	68	392	460
	632	2,096	1,324	3,420
347	Limestone Hills CP			
	731	147	0	147
	732	299	114	413
348	Limestone Hills CP			
	732	587	99	686
	Loamy CP			
	716	223	0	223
	Shallow CP			
	783	1,376	61	1,437
349	Limestone Hills CP			
	731	461	0	461
	732	316	0	316
	Loamy CP			
	716	213	0	213
	Shallow CP			
	783	228	0	228
360	Bottomland CP			
	724	0	109	109
	Limestone Hills CP			
	732	302	57	359
	Loamy CP			
	719	18	164	182
	735	223	95	318
	Sandy CP			
	709	98	254	352
	717	293	88	381
	756	664	0	664
	Shallow CP			
	783	107	63	170
NON-AMPs				
017	Hills CP			
	785	887	0	887
	Limestone Hills WP-2			
	482	144	0	144
	WP-3			
	432	407	0	407

TABLE A-19 (continued)

SOILS AND RANGE SITES BY ALLOTMENT

ALLOT.	RANGE SITE, MLRA, SOIL MAPPING UNIT	ACRES* PUBLIC	OTHER	TOTAL
NON-AMPs				
017 (cont.)	Loamy WP-3			
	418	146	0	146
	419	403	0	403
	Shallow Sandstone WP-2			
	434	1,135	0	1,135
113	Deep Sand SD			
	620	187	0	187
134	Limestone Hills WP-2			
	432	732	0	732
	482	660	0	660
143	Sandy SD			
	632	310	0	310
145	Basalt Hills WP-3			
	406	481	0	481
	Gravelly WP-3			
	441	1,581	0	1,581
	Loamy WP-3			
	445	320	0	320
	Shallow Sandstone WP-2			
	434	1,560	0	1,560
165	All soils have less than 100 acres.			
267	Hills WP-3			
	404	1,490	0	1,490
	442	793	0	793
	Loamy WP-3			
	453	160	0	160
281	Hills WP-3			
	404	1,929	0	1,929
	442	1,275	0	1,275
	Loamy WP-3			
	445	707	0	707
	453	833	0	833
	467	828	0	828
282	Loamy CP			
	735	419	0	419
	748	243	0	243
	Sandy CP			
	756	164	0	164
296	Loamy WP-3			
	410	2,656	0	2,656
	445	1,062	0	1,062
	453	1,594	0	1,594
310	Sandy CP			
	717	679	0	679
	752	436	0	436
	756	127	0	127
340	Hills CP			
	786	146	0	146
	Limestone Hills CP			
	731	352	0	352
	Loamy CP			
	710	294	0	294
	735	137	0	137
340 (cont.)	Sandy CP			
	709	599	0	599
	756	108	0	108
	Shallow CP			
	783	404	0	404
341	Loamy CP			
	716	106	0	106
342	Limestone Hills CP			
	732	341	0	341
	Loamy CP			
	716	123	0	123
	738	227	0	227
	Shallow CP			
	783	831	0	831
343	Shallow CP			
	783	1,543	0	1,543
345	Gravelly SD			
	655	132	0	132
	Loamy WP-3			
	445	678	0	678
	Shallow WP-3			
	459	102	0	102
	No Range Site			
	491	135	0	135
350	Limestone Hills CP			
	731	314	0	314
	Loamy CP			
	719	395	0	395
	735	401	0	401
	Shallow CP			
	783	202	0	202
351	Gravelly WP-3			
	449	520	0	520
	SD			
	655	209	0	209
	Loamy WP-3			
	445	718	0	718
	No Range Site			
	491	133	0	133
352	Hills CP			
	786	300	0	300
	Limestone Hills CP			
	731	636	0	636
	732	272	0	272
	Loamy CP			
	716	168	0	168
	719	1,191	0	1,191
	738	289	0	289
	Shallow CP			
	783	851	0	851

TABLE A-19 (continued)

SOILS AND RANGE SITES BY ALLOTMENT

ALLOT.	RANGE SITE, MLRA, SOIL MAPPING UNIT	ACRES* PUBLIC	OTHER	TOTAL
NON-AMPs				
353	Loamy CP			
	716	528	0	528
	719	176	0	176
	Shallow CP			
	783	630	0	630
354	All soils are less than 100 acres			
355	Loamy WP-3			
	453	1,696	0	1,696
356	Hills WP-3			
	404	459	0	459
	Shallow WP-3			
	490	122	0	122
358	Loamy CP			
	716	245	0	245
	Shallow CP			
	783	2,058	0	2,058
361	Gypsum CP			
	736	402	0	402
362	All soils are less than 100 acres			

ALLOT.	RANGE SITE, MLRA, SOIL MAPPING UNIT	ACRES* PUBLIC	OTHER	TOTAL
ELIMINATION OF GRAZING				
286	Gravelly SD			
	652	345	0	345
302	Gravelly SD			
	649	105	0	105
	Hills CP			
	785	266	0	266
311	All soils are less than 100 acres			
357	Hills CP			
	785	803	0	803
	Loamy WP-3			
	421	108	0	108
	No Range Site			
	491	168	0	168

* Soils that have less than 100 acres on an allotment are not listed. All acres are rounded off to the nearest whole acre.

Source: Socorro County Soil Survey, Socorro District

METHODOLOGY FOR DETERMINING WIND ERODIBILITY GROUPS (WEG)

Soils were placed in wind erodibility groups according to the texture of the surface inch of soil, unless very wet or stony, according to the following SCS technical guide (1976). WEG's were developed with the soil in a nonvegetated condition.

Guide for Estimating Wind Erodibility Group from Soil Textures

Texture of surface inch	WEG
Very fine sand, fine sand, and medium sand	1
Loamy sand, loamy fine sand	2
Very fine sandy loam, fine sandy loam, sandy loam	3
Clay, silty clay, noncalcareous clay loam and silty clay loam with more than 35 percent clay content	4
Calcareous loam and silt loam; calcareous clay loam and silty clay loam with less than 35 percent clay content	4L
Noncalcareous loam and silt loam with less than 20 percent clay content; sandy clay loam, sandy clay	5
Noncalcareous loam and silt loam with more than 20 percent clay content; noncalcareous clay loam with less than 35 percent clay content	6
Silt; noncalcareous silty clay loam with less than 35 percent clay content	7
Very wet or stony; not subject to wind erosion	8

The adjectives to be used in describing the soil blowing hazard based on wind erodibility group are:

WEG-1	Very High Soil Blowing Hazard
WEG-2	Very High Soil Blowing Hazard
WEG-3	High Soil Blowing Hazard
WEG-4	High Soil Blowing Hazard
WEG-4L	High Soil Blowing Hazard
WEG-5	Moderate Soil Blowing Hazard
WEG-6	Moderate Soil Blowing Hazard
WEG-7	Moderate Soil Blowing Hazard
WEG-8	Slight Soil Blowing Hazard

PSIAC METHOD FOR CALCULATING SEDIMENT YIELD

The Pacific Southwestern Inter-Agency Committee's (1968) Method for determining soil loss was used in the water erosion portion of the Soils Section.

The following is the sediment yield classification:

Sediment Yield Classification	Rating	Sediment Yield Ac. ft./sq. mi./ yr.
1 Severe	More than 100	More than 3.0
2 Critical	70-100	1.0-3.0
3 Moderate	50-70	0.5-1.0
4 Slight	27-50	0.2-0.5
5 Stable	Less than 27	Less than 0.2

Nine factors were evaluated for present and future sediment yield, and points were assigned to each factor by using the PSIAC nomographs. The points were totaled for each soil and placed in sediment yield classes. The following are the factors for evaluation use to determine these ratings.

Factors	PSIAC Factor Rating Minimum	PSIAC Factor Rating Maximum
A. - Surface Geology -	0	10
B. - Soils -	0	10
C. - Climate -	0	10
D. - Precipitation Intensity - (Runoff)	0	10
E. - Topography -	0	20
F. - Cover -	-10	10
G. - Land Use -	-10	10
H. - Upland Erosion -	0	25
I. - Channel Erosion and Sediment Transport -	0	25

A. - Surface Geology -

Surface geology was evaluated as soil texture from a depth of 0 to 4 inches to determine this rating. Sandy soils received the lowest rating, 0, and soils with a high clay content received a high rating, 10.

B. - Soils -

This factor was rated the same as surface geology except the depth is 4 inches to effective rooting depth.

C. - Climate -

Climate was rated according to the value on the PSIAC nomograph for a 2-year, 6-hour, isopluvial storm in the NOAA Atlas 2.

D. - Precipitation Intensity - (Runoff)

Precipitation intensity was rated the same as climate for the Existing Environment, but was rated 1 or 2 points lower for the Proposed Action according to the runoff reductions in the Water Resources Section.

E. - Topography -

This factor was rated according to the percent slope. A soil with a 30-percent slope got the maximum number of points, 20, and a nearly level soil got the minimum factor rating, 0.

F. - Cover -

The amount of cover includes the percent cover from vegetation plus the percent coarse fragments on the soil surface. A soil with 100-percent cover would receive a rating of -10. A soil with 0-percent cover would receive a rating of 10. Percent cover and the associated PSIAC rating for the Existing Environment, Proposed Action, and alternatives is presented in Table A-21, p. A-77.

G. - Land Use -

Land use was determined by the percent utilization from the Vegetation Section. A soil with 100-percent utilization would receive a rating of 10. A soil with 0-percent utilization would receive a rating of -10.

H. - Upland Erosion -

SSFs were used for rating the amount of upland erosion. The SSF for the most representative soil was used for every mapping unit. SSF methodology is presented in Appendix 1, Figure A-2, p. A-11.

I. - Channel Erosion and Sediment Transport -

The rating for this factor was determined by field observation for the amount of gullying. A soil with active headcuts and continuously eroding banks would receive the maximum rating of 25.

PSIAC factor points were totaled and assigned a sediment yield value from Table A-21, p. A-77. An example of factors affecting a high, medium, and low sediment yield and their associated PSIAC factor rating is presented in Figure A-8, p. A-76.

Methodology for Calculating Sediment Yield

The only variables for this method are precipitation intensity (runoff), cover, land use, and SSFs (upland erosion). Each soil was rated by the PSIAC method for Existing Environment and Proposed Action. The range site sediment yield values are the weighted average of all the soils in that range site.

<u>Existing Environment</u>

D - Precipitation intensity was determined from the NOAA Atlas 2 and was rated 7 for WP-2 and WP-3, 6 for SD, and 8 for CP.

F - Cover was rated by the percent coarse fragments on the soil surface plus the vegetative cover. The vegetative cover is the weighted average of the percent cover for all the vegetative types in a particular range site and is calculated from Table 2-2 in the Vegetation Section.

G - Land use is the average percent utilization over the entire ES Area. For the present it is 70 percent and is rated 5 for factor G.

H - The SSF for the most representative soil in each mapping unit was used (SSFs were determined by the range survey).

<u>Proposed Action</u> -

D - Runoff (precipitation intensity) reductions from the Water Resources Section amounted to a 2 point reduction for factor D.

F - Cover changed according to range site (Table A-20, p. A-75).

G - Land use for the Proposed Action was reduced to 50 percent which was rated 1 for factor G.

H - The future SSF value was used. In some cases there would be no change in the SSF points and in other cases there would be as much as a 5-point reduction.

There was a minimum of a 6-point reduction for the Proposed Action plus any change in cover and SSF.

<u>No Action/Future Environment</u>

The 25 existing AMP allotments would have the same sediment yield values as the Proposed Action and the 96 non-AMP allotments would have the same sediment yield values as the Existing Environment.

<u>Livestock Adjustment</u>

D - Precipitation intensity (runoff) was reduced 1 point.

F - Cover changes are displayed in Table A-20, p. A-75 by range site.

G - Land use was changed to 50 percent and was rated 1.

H - The SSF value used was .5(EE-PA)+PA.

This alternative resulted in a minimum 5-point reduction from the Existing Environment plus any change in SSF and cover by range site.

<u>Pasture Capacity Level/Enhancement of Sensitive Resource Values</u>

D - Precipitation intensity (runoff) was reduced by 2 points.

F - Cover changes are displayed in Table A-20, p. A-75 by range site.

G - Land use changed to 39 percent and was rated 0.

H - The same SSF as the Proposed Action was used. There was a minimum of a 7-point reduction plus any change in cover or SSF.

<u>No Grazing</u> - On Public Land Only

D - Precipitation intensity (runoff) was reduced by 1 point.

F - Cover changes are displayed in Table A-20, p. A-75.

G - Land use was 0 and was rated -10.

H - The same SSF as the Proposed Action was used.

The No Grazing Alternative resulted in a 10-point reduction from the Proposed Action plus the change in cover by range site.

TABLE A-20

PERCENT COVER AND PSIAC FACTOR RATING FOR COVER*
FOR SOIL EROSION CALCULATIONS BY RANGE SITE

		EE-NA/FE***		PA-NA/FE****		LA		PCL/ESR		NG**	
Range Site	MLRAs	% Cover	PSIAC* Cover Factor Rating	% Cover	PSIAC* Cover Factor Rating	% Cover	PSIAC* Cover Factor Rating	% Cover	PSIAC* Cover Factor Rating	% Cover	PSIAC* Cover Factor Rating
Basalt Hills											
	WP-2	34	+3	35	+3	34	+3	38	+2	38	+2
	WP-3	24	+5	24	+5	24	+5	26	+5	26	+5
Bottomland											
	WP-2	15	+7	25	+5	22	+6	27	+5	18	+6
	WP-3	6	+9	6	+9	6	+9	7	+9	7	+9
	SD	19	+6	23	+5	22	+6	25	+5	22	+6
	CP	24	+5	34	+3	31	+4	37	+3	28	+4
Deep Sand											
	SO	18	+6	18	+6	18	+6	20	+6	20	+6
Gravelly											
	WP-3	47	+1	50	0	50	0	55	-1	55	-1
	SO	53	-1	54	-1	54	-1	59	-2	60	-2
	CP	54	-1	54	-1	54	-1	59	-2	60	-2
Gypsum											
	SO	16	+7	16	+7	16	+7	17	+7	18	+6
	CP	24	+5	28	+4	27	+5	31	+4	27	+5
Gypsum Hills											
	CP	29	+4	29	+4	29	+4	32	+4	33	+3
Hills											
	WP-3	46	+1	48	0	48	0	52	0	52	0
	CP	51	0	54	-1	53	-1	59	-2	57	-1
Igneous Hills											
	SD	45	+1	45	+1	45	+1	49	0	50	0
Limestone Hills											
	WP-2	44	+1	45	+1	45	+1	49	0	49	0
	WP-3	64	-3	68	-4	67	-3	74	-5	72	-4
	SO	61	-2	63	-3	62	-2	68	-4	68	-4
	CP	46	+1	50	0	49	0	55	-1	52	0
Loamy											
	WP-2	20	+6	27	+5	25	+5	30	+4	23	+5
	WP-3	34	+3	38	+2	37	+3	42	+2	39	+2
	SD	27	+5	29	+4	28	+4	32	+4	30	+4
	CP	26	+5	33	+3	31	+4	35	+3	29	+4
Malpais											
	WP-2	36	+3	44	+1	41	+2	48	0	41	+2
	WP-3	29	+4	31	+4	31	+4	34	+3	35	+3
	SO	57	-1	57	-1	57	-1	62	-2	64	-3
	CP	31	+4	31	+4	31	+4	34	+3	35	+3
Sandstone Hills											
	WP-2	47	+1	47	+1	47	+1	51	0	53	-1
Sandy											
	WP-2	16	+7	16	+7	16	+7	17	+7	18	+6
	WP-3	10	+8	11	+8	11	+8	12	+8	12	+8
	SO	24	+5	28	+4	27	+5	31	+4	27	+5
	CP	25	+5	33	+3	31	+4	35	+3	34	+3
Shallow											
	WP-2	46	+1	46	+1	46	+1	50	0	52	0
	WP-3	40	+2	45	+1	44	+1	49	0	45	+1
	CP	48	0	53	-1	52	0	58	-2	54	-1
Shallow Sandstone											
	WP-2	35	+3	35	+3	35	+3	38	+2	39	+2
Shallow Sandy											
	SD	26	+5	26	+5	26	+5	28	+4	29	+4
Average % Cover		34.1		36.8		36.1		40.1		38.7	

* PSIAC Factor Rating for Cover is explained in Appendix 3, p. A-73.

** EE - Existing Environment
NA/FE - No Action Alternative and Future Environment
PA - Proposed Action
LA - Livestock Adjustment Alternative
PCL/ESR - Pasture Capacity Level and Enhancement of Sensitive Resource Values Alternative
NG - No Grazing Alternative (on public land)

*** NA/FE on non-AMP allotments
****NA/FE on AMP allotments

Source: Range Survey and Socorro County Soil Survey, Socorro District

FIGURE A-8

AN EXAMPLE OF FACTORS AFFECTING A HIGH, MODERATE, AND LOW SEDIMENT YIELD IN THE PACIFIC SOUTHWEST

Sediment Yield Levels	A Surface Geology (Surface Texture ¼"-4")	B Soils (Texture from 4" to ERD)	C Climate	D Precipitation Intensity (Runoff)	E Topography (Slope)	F Cover (Vegetation and Coarse Fragments)	G Land Use (Average % Utilization)	H Upland Erosion (SSFs)	I Channel Erosion and Sediment Transport
PSIAC Factor Rating	(10)	(10)	(10)	(10)	(20)	(10)	(10)	(25)	(25)
Maxium PSIAC Rating=130 High	Fine textured soils: easily dispersed Sandy clay, silty clay, clay	Fine texture soils: easily dispersed Sandy clay, silty clay, clay	2.0 value for a 2-year, 6-hour isopluvial	2.0 value for a 2-year, 6-hour isopluvial	Slopes greater than 30%	0% ground cover	100% Utilization	SSF=100	Eroding banks continuously or at frequent intervals with large depths and long flow duration Active head-cuts and degradation in tributary channels
PSIAC Factor Rating	(5)	(5)	(5)	(5)	(10)	(0)	(0)	(10)	(10)
Moderate	Medium textured soils Loam, silt loam, silt	Medium textured soils Loam, silt loam, silt	.9 value for 2-year, 6-hour isopluvial	.9 value for 2-year, 6-hour isopluvial	15% Slopes	50% ground cover	40% Utilization	SSF=34	Moderate flow depths, medium flow duration with occasionally eroding banks or bed
PSIAC Factor Rating	(0)	(0)	(0)	(0)	(0)	(-10)	(-10)	(0)	(0)
Minimum PSIAC Rating=-20 Low	Coarse textured soils Sand, loamy sand	Coarse textured soils Sand, loamy sand	0 value for a 2-year, 6-hour isopluvial	0 value for a 2-year, 6-hour, isopluvial	Slopes less than 3%	100% ground cover	0% Utilization	SSF=0	Wide shallow channels with flat gradients, short flow duration Channels in massive rock, large boulders, or well vegetated Artificially controlled channels

*ERD=Effective root depth

Source: PSIAC, 1968

AN EXAMPLE OF PSIAC SEOIMENT YIELO CALCULATION FOR 8LUEPOINT SAND
(Mapping Unit 620)

FOR EXISTING ENVIRONMENT:

Factors	PSIAC Factor Rating
A. The surface texture is sand which receives a 0 rating.	0
8. The texture from 4 inches to the effective rooting depth is a find sand which receives a 0 rating.	0
C. Climate is rated 6 because this soil is in the SO MLRA.	6
O. Precipitation intensity is rated the same as climate, 6.	6
E. Topography is rated 2 because the slope range is 1 to 5 percent.	2
F. Percent cover on a deep sand range site is 18 percent, for a rating of 6 (Appendix 3, Table A-20, p. A-75).	6
G. Land use, percent utilization, is presently 70 percent; so this factor receives a rating of 5.	5
H. The present SSF is 50 which receives a factor rating of 14.	14
I. The sandy 8luepoint soil has very little gullying; so it receives a rating of 2 for channel erosion and sediment transport.	2
TOTAL RATING =	41

Refer to Table A-21, p. A-77 to convert the PSIAC factor rating to a sediment yield value. A PSIAC rating of 41 has a sediment yield of .35 acre-feet per square mile per year and is in the slight sediment yield class, .20 to .50 acre-feet per square mile per year.

TABLE A-21

PSIAC CONVERSION FACTORS

Total PSIAC Factor Rating	Sediment Yield Ac.-ft./mi.sq./yr.	Total PSIAC Factor Rating	Sediment Yield Ac.-ft./mi.sq./yr.	Total PSIAC Factor Rating	Sediment Yield Ac.-ft./mi.sq./yr.	Total PSIAC Factor Rating	Sediment Yield Ac.-ft./mi.sq./yr.
1	.0	26	.190	51	.52	76	1.25
2	.0	27	.20	52	.53	77	1.30
3	.0	28	.20	53	.55	78	1.35
4	.0	29	.21	54	.56	79	1.40
5	.0	30	.22	55	.58	80	1.45
6	.1	31	.24	56	.60	81	1.50
7	.1	32	.25	57	.63	82	1.55
8	.11	33	.26	58	.65	83	1.60
9	.11	34	.27	59	.68	84	1.65
10	.12	35	.28	60	.70	85	1.78
11	.12	36	.29	61	.73	86	1.80
12	.13	37	.30	62	.75	87	1.90
13	.130	38	.31	63	.79	88	2.0
14	.14	39	.33	64	.82	89	2.05
15	.138	40	.34	65	.85	90	2.1
16	.140	41	.35	66	.87	91	2.15
17	.143	42	.36	67	.91	92	2.20
18	.145	43	.37	68	.95	93	2.30
19	.148	44	.38	69	.98	94	2.40
20	.150	45	.40	70	1.00	95	2.50
21	.160	46	.42	71	1.08	96	2.60
22	.170	47	.44	72	1.15	97	2.70
23	.18	48	.45	73	1.18	98	2.80
24	.19	49	.48	74	1.20	99	2.90
25	.19	50	.50	75	1.23	100	3.00

Source: BLM PSIAC Nomographs

Additional Methodologies

More extensive methodologies regarding sediment yield calculations are filed in the 8LM Socorro District Office.

APPENDIX 4

WATER RESOURCES

METHODOLOGY USED IN CALCULATIONS FOR WATERSHED DATA

The lack of historical streamflow data for the ephemeral streams in the ES Area makes it difficult to predict the changes in surface runoff that may be expected as a result of grazing management. Several methods of estimating peak flows from ungaged watersheds have been developed based on empirical relations between various watershed parameters and peak flow rates. In order to use these methods, individual watersheds were selected from the ES Area and tested with various methodologies to determine which approaches would be most useful for describing the response of peak flows to changes in vegetative cover. The process of estimating changes in surface runoff due to improved grazing management in the ES Area was accomplished in three steps. A detailed discussion of the procedures used in each step of the analysis follows.

Selection of Representative Watersheds

Two respresentative watersheds were selected from each of the major drainages described in the Existing Environment portion of Water Resources for use in the peak flow calculations. Watersheds were selected from the Rio Puerco and Rio Salado drainages, the Jornada closed basin, and tributary areas draining directly into the Rio Grande on the basis of the following criteria: watershed area, percent of public land subject to the Proposed Action, vegetative and hydrologic soil types.

Watershed areas of approximately 10 and 25 square miles were arbitrarily selected for the peak flow calculations, although some watersheds were larger. The percent of public land in the watershed had to constitute at least 30 percent of the total watershed area to ensure that the representative areas selected were subject to the Proposed Action. Vegetation in the selected watershed was considered representative of the major drainage (e.g., the Jornada Closed Basin) only if that same vegetative type constituted at least 15 percent of the entire drainage area vegetation. Hydrologic soil types were judged to be representative in a similar manner.

The location, size, and various other physical parameters of the watersheds selected for runoff computations are presented in Table 2-12. In the Rio Puerco and Rio Salado drainages, public land was the limiting factor in selecting appropriate watersheds, as much of the land in these drainages is privately or State owned.

Peak Flow Methodologies

Three methodologies initially were applied to the representative watersheds for estimating peak flow response to variations in vegetative cover: the Soil Conservation Service (SCS, 1972) Method, the SCS Method Adapted for Infiltration (Gifford et al 1975) and the Federal Highway Administration (FHWA) Method (Fletcher et al 1976). To determine which method to use in the ES calculations, each method was compared to real data collected from streamflow records for Canada Montosa, an arroyo draining an area of 28.2 square miles in the northeast corner of the ES Area. United States Geological Survey (USGS) crest stage records date back to 1961 for this arroyo. It was possible to calculate flood flows for various return periods up to 25 years using the Log-Pearson Type III Method (U. S. Water Resources Council, 1976). The results of these calculations are presented in Table A-22.

TABLE A-22

SCS, MODIFIED SCS, FHWA, AND LOG-PEARSON TYPE III FLOWS ON CANADA MONTOSA
in cubic feet per second (c.f.s.)

Flood Year	SCS	Modified SCS	FHWA	Log Pearson Type III
2	3,247	3,897	56	313
5	6,278	6,928	83	1,039
10	9,958	10,824	117	2,379
25	14,072	15,154	160	6,823

Source: BLM Socorro District Files

Table A-22, p. A-78, also presents estimates of the 2-, 5-, 10-, and 25-year floods for Canada Montosa as calculated by the three methods previously mentioned. Each of these methods was compared to the Log-Pearson flood estimates by a linear regression analysis relating predicted flows to real (Log-Pearson) flood flows. The resulting equations are presented below:

For the SCS Method: $\log Y = -4.71+2.04 \log X$ $r^2 = .99$

Modified SCS Method: $\log Y = -5.45+2.21 \log X$ $r^2 = .99$

FHWA Method: $\log Y = -2.62+2.91 \log X$ $r^2 = .99$

Where Y = real (Log-Pearson) peak flows

X = predicted peak flows

As can be seen from the r^2 values (r^2 range from 0 to 1, with 1 indicating the "best fit" and 0 indicating the poorest fit), all three methods show a strong relation to the real data. For convienence the SCS Method was chosen and used for quantifying changes in runoff as it is the easiest to adapt to changes in vegetative cover. The SCS Method may over-estimate peak flows; however, if it is consistently applied to present and future watershed conditions, it should yield representative values for the relative reductions which may be expected as a result of improved vegetative cover.

Example Application of SCS Method

After selecting the SCS approach for use in the ES, the method was tested on a small watershed in the Jornada Basin to determine its response to small changes in vegetation. Figure A-9, p. A-80, summarizes present and anticipated future vegetative cover for the small watershed in the Jornada closed basin, and the following Figure A-10, p. A-81, calculates changes in peak flow resulting from the increased cover. Anticipated increases in cover are relatively small (5 percent), with one exception of 12 percent, and infiltration curve numbers are reduced less than 1 percent. Reductions in runoff ranged up to 5 percent as calculated by the SCS Method; and it appeared that the SCS Method is responsive to even small changes in vegetative cover. Similar reductions in surface runoff for other watersheds in the ES Area were calculated in the same manner and are presented in the text. Table A-23, p. A-82, shows the cover values used for Existing Environment and Proposed Action conditions for all eight watersheds.

Table A-23, p. A-82, shows an individual breakdown of each watershed by vegetative type and hydrologic soil group. Cover values are presented for the Existing Environment and the Proposed Action. Conversion factors for the Livestock Adjustment (LA), Pasture Capacity Level (PCL), Enhancement of Sensitive Resource Values (ESR), and No Grazing (NG) Alternatives' cover values are presented below. Cover values for the various alternatives are computed based on the known cover values for the Existing Environment (EE) and the predicted cover for the Proposed Action (PA).

NA = .28(PA-EE) + EE   LA = .7(PA-EE) + EE   PCL = .09(PA) + PA   ESR = PCL   NG = .12(LA) + EE

Table A-23, p. A-82, indicates there are generally small changes in cover values from Existing Environment to Proposed Action. In many cases the cover change was small (3 to 4 percent). For example, in the Rio Grande Large Watershed (Arroyo de Las Canas), there is an Existing Enivronment cover value of 57 for the .2 square miles of creosote in soil type B. For the Livestock Adjustment Alternative (LA) cover = .7(61-57) + 57 = 60.

GENERAL REMARKS

It should be noted that BLM contracted for water quality data collection due to lack of data and manpower. The availability and adequacy of existing monitoring stations for both surface and groundwater data is poor. The USGS currently maintains several monthly monitoring stations along the Rio Grande in addition to three partial recording stations which measure peak flows. There is a definite need for water quality monitoring on a year-round basis in the ES Area. BLM is planning to conduct an on-going water survey in the area in the near future.

FIGURE A-9

METHOD FOR ESTIMATING A SITE SPECIFIC CURVE NUMBER FOR A SMALL WATERSHED
(Example - Jornada Closed Basin)

1. Determine curve numbers from SCS Manual for each vegetative - hydrologic soil group complex. Area, vegetative type, and cover data taken from Table A-23, p. A-82.

EE					PA				
Area (Sq.mi)	Veg. /1 Type	Cover	Hydro. /2 Soil Group	SCS Curve Number	Area (Sq.mi)	Veg. /1 Type	Cover	Hydro. /2 Soil Group	SCS Curve Number
0.8	G	19	A	57.68	0.8	G	19	A	57.68
2.5	G	32	B	74.04	2.5	G	32	B	74.04
1.3	G	19	C	85.58	1.3	G	34	C	82.88
0.7	G	57	D	83.59	0.7	G	57	D	83.59
0.4	DS	28	B	82.32	0.4	DS	33	B	82.02
0.1	DS	12	D	92.28	0.1	DS	24	D	91.55
1.1	CR	57	B	80.58	1.1	CR	61	B	80.34
0.7	CR	61	C	86.34	0.7	CR	64	C	86.16
0.9	CR	68	D	89.52	0.9	CR	60	D	89.40
0.1	HS	27	C	82.38	0.1	HS	27	C	82.38
8.6					8.6				

2. Estimate site specific curve numbers using the following formula:

$$\frac{\text{Area of Vegetative-Hydrologic Soil Group Complex}}{\text{Total Area of Watershed}}\text{(SCS Curve Number)} = \text{Complex Curve Number}$$

Existing Environment	Proposed Action
$\frac{0.8}{8.6}(57.68) = 5.37$	$\frac{0.8}{8.6}(57.68) = 5.37$
$\frac{2.5}{8.6}(74.04) = 21.52$	$\frac{2.5}{8.6}(74.04) = 21.52$
$\frac{1.3}{8.6}(85.58) = 12.94$	$\frac{1.3}{8.6}(82.88) = 12.53$
$\frac{0.7}{8.6}(83.59) = 6.80$	$\frac{0.7}{8.6}(83.59) = 6.80$
$\frac{0.4}{8.6}(82.32) = 3.83$	$\frac{0.4}{8.6}(82.02) = 3.81$
$\frac{0.1}{8.6}(92.28) = 1.07$	$\frac{0.1}{8.6}(91.55) = 1.06$
$\frac{1.1}{8.6}(80.58) = 10.31$	$\frac{1.1}{8.6}(80.34) = 10.28$
$\frac{0.7}{8.6}(86.34) = 7.03$	$\frac{0.7}{8.6}(86.16) = 7.01$
$\frac{0.9}{8.6}(89.52) = 9.37$	$\frac{0.9}{8.6}(89.40) = 9.36$
$\frac{0.1}{8.6}(82.38) = .96$	$\frac{0.1}{8.6}(82.38) = .96$
Estimated Site Specific CN = 79.20	Estimated Site Specific CN = 78.70

/1 PJ - Pinyon-Juniper; CR-Creosote; DS - Desert Shrub; G-Grass; HS - Half Shrub

/2 Hydrologic Soil Groups: As the groups go from A to D, the amount of runoff increases and the amount of infiltration decreases.

Source: BLM Socorro District Files

FIGURE A-10

SCS METHOD FOR CALCULATING PEAK DISCHARGE FROM SMALL UNGAGED WATERSHEOS
(Example: Jornada Small Watershed - Sierra Larga)

1. Estimated site specific curve numbers: taken from Figure A-9, p. A-80.

2. Estimated site specific depth of runoff (Q):
6-hour precipitation data (P) from the NOAA Atlas, for 2-, 5-, 10-, and 25-year flow events; the site specific curve numbers and the following equation were used to estimate site specific depth of runoff (Q).

6-Hour Precipitation (P)	
2 year	1.1 inches
5 year	1.4 inches
10 year	1.7 inches
25 year	2.0 inches

Where:

CN = Site Specific Curve Number

P = Precipitation (Inches)

$$S = \frac{(1000)}{CN} - 10$$

$$Q = \frac{(P - .2S)^2}{(P + .8S)}$$

$$\text{Second year } Q = \frac{(1.1 - .2S)^2}{(1.1 + .8S)} = .10 \text{ Inches}$$

	Runoff (Q) EE	Runoff (Q) PA
2 year	.10	.10 inches
5 year	.22	.21 inches
10 year	.36	.35 inches
25 year	.53	.51 inches

3. Calculated time of concentration (T_c Hours):

Where:

L = Channel Length (Miles)

H = Elevation Difference (Feet)

$$T_c = \left(\frac{1.9\ L^3}{H}\right)^{.385}$$

$$T_c \text{ for Jornada Small (Sierra Larga)} = \left[\frac{1.9\ (4.81)^3}{720}\right]^{.385} = 1.26 \text{ hours}$$

4. Estimated peak discharge, (q_p) in cubic feet per second (cfs)

Where:

$$T_p = 0.67\ T_c$$

A = Area of Watershed

$$q_p = \frac{484\ AQ}{T_p}$$

$$\text{Second year } q_p = \frac{(484)(8.6)(1.1)}{.67(1.26)} = 493 \text{ cfs}$$

Peak discharge for Jornada Small Watershed (Sierra Larga)

	Peak Discharge (q_p) EE	Peak Discharge (q_p) PA
2 year	493	493 cfs
5 year	1,085	1,035 cfs
10 year	1,775	1,726 cfs
25 year	2,613	2,515 cfs

Source: BLM Socorro District Files

TABLE A-23

SOIL-VEGETATIVE COVER COMPLEXES

JORNADA CLOSED BASIN

Small — Sierra Larga Watershed (SD MLRA)					Large — Canon Quemado Watershed (SD MLRA)				
Area (Sq.Mi.)	Veg. Type	Soil Group	Cover Values EE	Cover Values PA	Area (Sq.Mi.)	Veg. Type	Soil Group	Cover Values EE	Cover Values PA
0.8	G	A	19	19	4.4	PJ	B	26	26
2.5	G	B	32	32	10.3	PJ	C	65	65
1.3	G	C	19	34	1.8	PJ	D	38	40
0.7	G	D	57	57	1.9	G	B	32	32
0.4	DS	B	28	33	1.5	G	C	19	34
0.1	DS	D	12	24	0.6	G	D	57	57
1.1	CR	B	57	61	0.2	DS	C	19	19
0.7	CR	C	61	64	0.1	DS	D	12	24
0.4	CR	D	58	60	0.1	CR	B	57	61
0.1	HS	B	27	27	0.3	CR	D	58	60
8.6					21.2				

RIO PUERCO DRAINAGE

Small — Rock Tank Watershed (WP-2 MLRA)					Large — Coyote Draw Watershed (WP-3 MLRA)				
Area (Sq.Mi.)	Veg. Type	Soil Group	Cover Values EE	Cover Values PA	Area (Sq.Mi.)	Veg. Type	Soil Group	Cover Values EE	Cover Values PA
3.1	PJ	B	16	16	8.5	PJ	B	44	44
1.4	PJ	C	45	45	32.5	PJ	C	63	63
8.4	PJ	D	28	28	3.1	PJ	D	49	49
3.2	G	B	17	36	0.4	SB	C	20	28
0.4	G	D	37	37	1.2	DS	C	50	50
1.5	DS	B	24	30	0.1	DS	D	30	33
0.4	DS	D	34	42					
0.3	WF	C	23	34					
0.1	SG	C	30	30					
18.8					45.8				

RIO GRANDE TRIBUTARIES

Small — Arroyo Del Tajo Watershed (SD MLRA)					Large — Arroyo De Las Canas Watershed (SD MLRA)				
Area (Sq.Mi.)	Veg. Type	Soil Group	Cover Values EE	Cover Values PA	Area (Sq.Mi.)	Veg. Type	Soil Group	Cover Values EE	Cover Values PA
2.1	PJ	D	36	40	2.0	PJ	B	26	26
1.7	CR	A	32	32	10.1	PJ	C	65	65
0.1	CR	B	57	61	4.9	PJ	D	38	40
2.6	CR	D	58	60	0.3	CR	A	32	32
0.1	DS	A	23	23	0.2	CR	B	57	61
0.5	DS	B	28	33	3.6	CR	C	61	64
0.2	DS	D	12	24	0.9	CR	D	58	60
					0.1	DS	A	23	23
					0.2	DS	B	28	33
					0.5	DS	C	19	19
					1.4	DS	D	12	24
					0.6	HS	B	27	27
					0.4	G	C	19	24
					0.1	G	D	57	57
7.3					25.3				

RIO SALADO DRAINAGE

Small — Ladron Mountain Watershed (WP-2 MLRA)					Large — Canada Bonita Watershed (WP-3 MLRA)				
Area (Sq.Mi.)	Veg. Type	Soil Group	Cover Values EE	Cover Values PA	Area (Sq.Mi.)	Veg. Type	Soil Group	Cover Values EE	Cover Values PA
1.8	PJ	B	44	44	1.8	PJ	B	16	16
6.1	PJ	C	63	63	1.1	PJ	C	45	45
4.4	PJ	D	49	49	15.5	PJ	D	28	28
0.1	SB	D	9	9	2.3	G	B	17	36
					1.7	G	D	37	37
					0.9	SB	B	15	21
					0.2	SB	D	16	25
					0.1	DS	B	24	30
					2.3	DS	D	34	42
					0.5	SG	D	30	30
12.4					26.4				

PJ-Pinyon-juniper; CR-Creosote; DS-Desert Shrub; G-Grass; HS-Half-Shrub; SB-Saltbush; SG-Sagebrush; WF-Winterfat

Hydrologic Soil Groups: As the groups go from A to D, the amount of runoff increases and the amount of infiltration decreases.

Source: BLM Socorro District Files and Range Survey

APPENDIX 5

LIVESTOCK GRAZING

TABLE A-24

RANCH SIZE AND USE LEVELS FOR EXISTING, PROPOSED ACTION AND ALTERNATIVES /1

	EE		PA				NA/FE				LA				PCL				ESR				NG	
Ranch /2	Short & Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short & Long Term	R C
002	5,352		2,632		3,463		5,352		5,352		2,632		3,341		1,911		4,246		1,772		4,280		3,576	
086	2,832		2,832		3,522		2,832		2,832		2,832		3,286		2,329		4,332		2,013		4,332		492	
301	6,129		3,559		5,502		6,129		6,129		3,559		5,050		2,584		6,750		2,584		6,750		3,009	
325	2,592		1,485		2,331		2,592		2,592		1,485		2,154		1,020		2,856		976		2,863		882	
TOTAL	16,905	H	10,508	H	14,818	H	16,905	H	16,905	H	10,508	H	13,831	H	7,844	H	18,184	H	7,345	H	18,225	H	7,959	H
006 /3	824	B	739	B	1,049	C	824	B	824	B	739	B	1,049	C	557	B	1,288	C	496	B	1,288	C	104	A
006 /3	824	B	739	B	1,049	C	824	B	824	B	739	B	1,049	C	557	B	1,288	C	496	B	1,288	C	104	A
012 /3	36	A	24	A	30	A	36	A	36	A	24	A	29	A	24	A	30	A	24	A	30	A	0	-
012 /3	60	A	41	A	51	A	60	A	60	A	41	A	49	A	41	A	51	A	41	A	51	A	0	-
016	2,358		2,254		4,227		2,358		2,358		2,254		3,878		1,703		5,208		1,627		5,225		1,098	
017 /1	4,842		4,605		4,605		4,842		4,842		4,605		4,605		4,605		4,605		4,605		4,605		4,434	
TOTAL	7,200	H	6,859	H	8,832	H	7,200	H	7,200	H	6,859	H	8,483	H	6,308	H	9,813	H	6,232	H	9,830	H	5,532	G
036	1,200		1,200		1,022		1,200		1,022		1,200		1,022		932		1,248		731		1,282		24	
037 /3	1,728		920		1,066		1,728		1,728		920		1,029		611		1,310		523		1,310		264	
TOTAL	2,928	F	2,120	E	2,088	E	2,928	F	2,750	F	2,120	E	2,051	E	1,543	0	2,558	F	1,254	C	2,592	F	288	A
037 /3	564	B	432	B	501	B	564	B	564	B	432	B	484	B	288	A	616	B	246	A	616	B	84	A
052	216	A	78	A	219	A	216	A	216	A	78	A	181	A	78	A	219	A	0	-	219	A	84	A
058	756	B	534	B	613	B	534	B	613	B	534	B	616	B	534	B	613	B	534	B	613	B	132	A
059	3,228	F	1,762	D	4,893	G	1,762	0	4,893	G	1,762	D	4,898	G	1,497	0	6,000	H	1,351	0	6,000	H	1,236	C
065	3,636	F	2,831	F	3,404	F	2,831	F	3,404	F	2,831	F	3,404	F	2,088	E	4,175	G	2,088	E	4,176	G	2,256	E
077	552	B	191	A	235	A	191	A	235	A	191	A	235	A	101	A	297	A	54	A	318	A	132	A
081 /3	325	A	325	A	348	A	325	A	348	A	325	A	349	A	234	A	426	B	234	A	426	B	-0-	-
081 /3	623	B	623	B	675	B	623	B	675	B	623	B	677	B	455	B	826	B	455	B	826	B	48	A
083	72		64		64		72		72		64		64		64		64		64		64		-0-	
165 /1	240		236		236		240		240		236		236		236		236		236		236		228	
TOTAL	312	A	300	A	300	A	312	A	312	A	300	A	300	A	300	A	300	A	300	A	300	A	228	A
089	96		43		57		96		96		43		53		43		57		43		57		48	
090	2,100		959		1,753		2,100		2,100		959		1,598		647		2,150		392		2,183		672	
TOTAL	2,196	E	1,002	C	1,810	E	2,196	E	2,196	E	1,002	C	1,651	D	690	B	2,207	E	435	B	2,240	E	720	B
091	732	B	478	B	672	B	478	B	672	B	478	B	674	B	389	B	823	B	389	B	823	B	12	A
113 /1	36	A	19	A	19	A	36	A	36	A	19	A	19	A	19	A	19	A	0	-	43	A	0	-
114	6,899	H	4,640	G	6,522	H	6,899	H	6,899	H	4,640	G	6,176	H	3,850	G	7,998	H	3,803	G	8,008	H	4,302	G

TABLE A-24 (continued)

RANCH SIZE AND USE LEVELS FOR EXISTING, PROPOSED ACTION AND ALTERNATIVES /1

	EE		PA				NA/FE				LA				PCL				ESR				NC	
Ranch /2	Short & Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short & Long Term	R C
121	1,032		848		1,337		848		1,337		848		1,331		848		1,337		848		1,337		123	
354 /1	24		0		0		24		24		0		0		0		0		0		0		D	
TOTAL	1,056	C	848	C	1,337	D	872	C	1,361	D	848	C	1,331	D	848	C	1,337	D	848	C	1,337	D	123	A
122	720	B	310	A	452	B	310	A	452	B	310	A	452	B	310	A	452	B	75	A	538	8	372	B
129	8,165	H	6,340	H	9,465	H	6,340	H	9,465	H	6,340	H	9,467	H	5,198	G	11,703	H	2,909	F	12,145	H	4,109	G
131 /3	780	B	407	B	612	B	780	B	780	B	407	B	561	B	288	A	752	B	288	A	752	B	54D	B
131 /3	780	B	407	B	612	B	780	B	780	B	407	B	561	B	288	A	752	B	288	A	752	B	540	B
134 /1	5,400	G	5,369	G	5,369	G	5,400	G	5,400	G	5,369	G	5,369	G	5,369	G	5,369	G	5,369	G	5,369	G	5,292	G
143 /1	180	A	157	A	157	A	180	A	180	A	157	A	157	A	157	A	157	A	157	A	157	A	144	A
145 /1	8,880	H	8,586	H	8,586	H	8,880	H	8,880	H	8,586	H	8,586	H	8,586	H	8,586	H	8,586	H	8,586	H	8,244	H
152	3,596	F	2,856	F	4,092	G	3,596	F	3,596	F	2,856	F	3,797	G	2,147	E	5,005	G	2,098	E	5,0D5	G	2,475	F
250 /3	216	A	61	A	81	A	216	A	216	A	61	A	79	A	56	A	104	A	15	A	114	A	24	A
250 /3	324	A	204	A	257	A	324	A	324	A	204	A	251	A	177	A	327	A	48	A	36D	B	94	A
250 /3	528	B	250	A	288	A	528	B	528	B	250	A	281	A	198	A	367	B	53	A	404	B	47	A
251	3,468		2,295		3,756		3,468		3,468		2,295		3,408		1,537		4,605		1,537		4,605		2,D40	
252	2,377		1,684		2,515		2,377		2,377		1,684		2,323		1,509		3,100		1,490		3,1D4		411	
275	12,384		7,649		11,256		12,384		12,384		7,649		10,329		5,833		13,846		5,453		13,792		7,356	
TOTAL	18,229	H	11,628	H	17,527	H	18,229	H	18,229	H	11,628	H	16,D6D	H	8,879	H	21,551	H	8,480	H	21,501	H	9,8D7	H
253	288	A	204	A	352	A	204	A	352	A	204	A	352	A	204	A	352	A	149	A	388	B	D	-
254	3,276	F	1,764	D	3,116	F	1,764	D	3,116	F	1,764	D	3,118	F	1,764	D	3,116	F	565	B	4,2D4	G	564	B
255	384		284		409		284		409		284		409		284		409		0		627		72	
256	2,004		1,474		2,024		1,474		2,024		1,474		2,D26		1,019		2,492		967		2,5D0		374	
TOTAL	2,388	E	1,758	D	2,433	F	1,758	D	2,433	F	1,758	D	2,435	F	1,303	C	2,901	F	967	C	3,127	F	446	B
258	1,116	C	965	C	1,199	C	1,116	C	1,116	C	965	C	1,139	C	482	B	1,472	D	20D	A	1,617	D	380	B
260	3,360		1,678		2,639		3,360		3,360		1,678		2,392		1,390		3,248		1,065		3,303		1,242	
310 /1	6,576		6,521		6,521		6,576		6,576		6,521		6,521		6,521		6,521		6,521		6,521		6,375	
360	624		628		757		624		624		628		725		628		757		628		757		325	
TOTAL	1D,560	H	8,827	H	9,917	H	10,56D	H	10,56D	H	8,827	H	9,638	H	8,539	H	1D,526	H	8,214	H	1D,581	H	7,942	H
261	2,705	F	2,705	F	2,900	E	2,705	F	2,900	E	2,7D5	F	2,9D0	E	2,540	F	2,865	F	1,736	D	3,339	F	519	B
262	2,940	F	2,105	E	2,841	F	2,940	F	2,940	F	2,105	E	2,664	F	1,444	D	3,499	F	1,444	D	3,659	F	1,382	D
263	2,066	E	1,893	E	2,987	F	2,066	E	2,D66	E	1,893	E	2,797	F	1,893	E	2,987	F	601	8	2,987	F	620	B
264 /3	564	B	447	8	654	B	564	B	564	8	447	B	612	8	447	B	654	B	442	B	688	B	71	A

TABLE A-24 (continued)

RANCH SIZE AND USE LEVELS FOR EXISTING, PROPOSED ACTION AND ALTERNATIVES /1

	EE		PA				NA/FE				LA				PCL				ESR				NG	
Ranch /2	Short & Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short & Long Term	R C
264 /3	660	B	699	B	1,022	C	660	B	660	B	699	B	958	C	699	B	1,022	C	692	B	1,075	C	177	A
266	1,764	0	1,282	C	2,006	E	1,764	D	1,764	D	1,282	C	1,831	E	956	C	2,465	F	956	C	2,465	F	252	A
267 /1	3,564	F	3,462	F	3,462	F	3,564	F	3,564	F	3,462	F	3,462	F	3,462	F	3,462	F	3,462	F	3,462	F	3,144	F
268 /3	4,320	G	1,947	E	6,423	H	4,320	G	4,320	G	1,947	E	5,601	G	1,500	D	7,871	H	1,440	D	7,884	H	1,251	C
268 /3 323 355 /1 TOTAL	1,200 1,800 2,328 5,328	G	582 1,912 2,467 4,961	G	1,918 2,913 2,467 7,298	H	1,200 1,800 2,328 5,328	G	1,200 1,800 2,328 5,328	G	582 1,912 2,467 4,961	G	1,673 2,691 2,467 6,831	H	448 1,006 2,467 3,921	G	2,351 2,913 2,467 7,731	H	430 1,006 2,467 3,903	G	2,355 2,958 2,467 7,780	H	240 828 2,035 3,103	F
271 /3	924	C	507	B	615	B	924	C	924	C	507	B	587	B	408	B	755	B	408	B	755	B	240	A
271 /3 340 /1 TOTAL	3,024 2,028 5,052	G	2,309 1,888 4,197	G	2,799 1,888 4,687	G	3,024 2,028 5,052	G	3,024 2,028 5,052	G	2,309 1,888 4,197	G	2,676 1,888 4,564	G	1,861 1,888 3,749	G	3,441 1,888 5,329	G	1,861 1,888 3,749	G	3,438 1,888 5,326	G	1,418 1,636 3,054	F
272	4,095	G	4,206	G	5,168	G	4,095	G	4,095	G	4,206	G	4,921	G	3,806	G	6,316	H	3,806	G	6,316	H	459	B
276 361 /1 TOTAL	557 5,443 6,000	H	310 5,361 5,671	G	438 5,361 5,799	G	557 5,443 6,000	H	557 5,443 6,000	H	310 5,361 5,671	G	405 5,361 5,766	G	310 5,361 5,671	G	438 5,361 5,799	G	310 5,361 5,671	G	438 5,361 5,799	G	144 5,328 5,472	G
277	2,244	E	1,691	D	2,302	E	2,244	E	2,244	E	1,691	D	2,180	E	1,151	C	2,822	F	371	B	3,117	F	83	A
279	1,500	0	1,500	D	1,544	D	1,500	D	1,544	0	1,500	0	1,544	D	1,411	0	1,896	E	1,296	C	1,958	E	163	A
280 358 /1 TOTAL	3,048 3,480 6,528	H	1,518 3,425 4,943	G	2,893 3,425 6,318	H	3,048 3,480 6,528	H	3,048 3,480 6,528	H	1,518 3,425 4,943	G	2,578 3,425 6,003	H	1,137 3,425 4,562	G	3,570 3,425 6,995	H	1,137 3,425 4,562	G	3,570 3,425 6,995	H	975 3,110 4,085	G
281 /1	3,552	F	3,270	F	3,270	F	3,552	F	3,552	F	3,270	F	3,270	F	3,270	F	3,270	F	3,270	F	3,270	F	2,367	E
282 /1	924	C	903	C	903	C	924	C	924	C	903	C	903	C	903	C	903	C	903	C	903	C	864	C
283	2,941	F	1,740	0	2,652	F	1,740	0	2,652	F	1,740	0	2,655	F	1,277	C	3,279	F	1,277	C	3,279	F	765	B
284	1,992	E	1,050	C	1,494	0	1,992	E	1,992	E	1,050	C	1,391	D	802	B	1,835	E	802	B	1,835	E	552	B
285	2,449	F	2,226	E	3,636	F	2,449	F	2,449	F	2,226	E	3,361	F	2,226	E	3,633	F	1,076	C	4,284	G	539	B
286	16	A	-0-	-	-0-	-	16	A	16	A	-0-	-	-0-	-	-0-	-	-0-	-	-0-	-	-0-	-	-0-	-
287	312	A	186	A	342	A	186	A	342	A	186	A	342	A	93	A	443	B	61	A	453	B	48	A
288	804	B	241	A	299	A	241	A	299	A	241	A	299	A	121	A	368	B	44	A	407	B	492	B
289 /3	108	A	108	A	175	A	108	A	175	A	108	A	175	A	79	A	214	A	79	A	214	A	15	A
289 /3	324	A	324	A	499	B	324	A	499	B	324	A	499	B	226	A	611	B	226	A	611	B	16	A
289 /3	540	B	540	B	823	B	540	B	823	B	540	B	824	B	373	B	1,009	C	373	B	1,007	C	238	A

TABLE A-24 (continued)

RANCH SIZE AND USE LEVELS FOR EXISTING, PROPOSED ACTION AND ALTERNATIVES /1

	EE		PA				NA/FE				LA				PCL				ESR				NG	
Ranch /2	Short & Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short & Long Term	R C
289 /3	648	B	648	B	998	C	648	B	998	C	648	B	999	C	452	B	1,222	C	452	B	1,221	C	9	A
290	2,208	E	2,287	E	3,564	F	2,208	E	2,208	E	2,287	E	3,358	F	2,287	E	3,564	F	2,287	E	3,564	F	864	C
291	1,716	D	1,199	C	1,891	E	1,716	0	1,716	0	1,199	C	1,713	D	824	B	2,320	E	824	B	2,318	E	180	A
293	6,264	H	6,106	H	8,120	H	6,264	H	6,264	H	6,106	H	7,607	H	5,217	G	9,943	H	3,708	F	9,941	H	814	B
294	1,274	C	1,332	0	1,453	0	1,274	C	1,274	C	1,332	D	1,422	0	1,332	D	1,453	D	480	B	1,793	0	688	B
295 345 TOTAL	2,720 4,120 6,840	H	1,230 3,955 5,185	G	1,398 3,955 5,353	G	2,720 4,120 6,840	H	2,720 4,120 6,840	H	1,230 3,955 5,185	G	1,354 3,955 5,309	G	1,230 3,955 5,185	G	1,396 3,955 5,351	G	1,230 3,955 5,185	G	1,395 3,955 5,350	G	1,724 3,917 5,641	G
296 /1	6,000	H	6,095	H	6,095	H	6,000	H	6,000	H	6,095	H	6,095	H	6,095	H	6,095	H	6,095	H	6,095	H	5,259	G
297	1,541	0	452	B	1,305	C	452	B	1,305	C	452	B	1,305	C	301	A	1,667	D	131	A	1,679	D	308	A
298 330 TOTAL	1,572 1,236 2,808	F	801 940 1,741	D	1,147 1,436 2,583	F	1,572 1,236 2,808	F	1,572 1,236 2,808	F	801 940 1,741	0	1,057 1,317 2,374	E	601 940 1,541	D	1,406 1,436 2,842	F	601 940 1,541	D	1,406 1,436 2,842	F	936 768 1,704	D
299	481	B	413	B	714	B	481	B	481	B	413	B	695	B	204	A	885	C	204	A	885	C	58	A
300	720	B	720	B	1,025	C	720	B	1,025	C	720	B	1,028	C	531	B	1,254	C	531	B	1,254	C	402	B
302	48	A	-0-	-	-0-	-	48	A	48	A	-0-	-	-0-	-	-0-	-	-0-	-	-0-	-	-0-	-	-0-	-
303	120	A	78	A	125	A	120	A	120	A	78	A	113	A	78	A	125	A	78	A	125	A	44	A
306	528	B	244	A	322	A	528	B	528	B	244	A	318	A	244	A	322	A	244	A	322	A	84	A
308 /3	264	A	81	A	96	A	264	A	264	A	81	A	92	A	40	A	122	A	19	A	133	A	119	A
308 /3	192	A	81	A	96	A	192	A	192	A	81	A	92	A	40	A	122	A	19	A	133	A	48	A
311	24	A	-0-	-	-0-	-	24	A	24	A	-0-	-	-0-	-	-0-	-	-0-	-	-0-	-	-0-	-	-0-	-
312	864	C	337	A	592	B	337	A	592	B	337	A	592	B	225	A	739	B	0	-	832	B	12	A
315 /3	23	A	0	-	65	A	23	A	23	A	0	-	55	A	0	-	65	A	0	-	85	A	0	-
315 /3	96	A	68	A	527	B	96	A	96	A	68	A	446	B	68	A	527	B	0	-	685	B	13	A
317	425	B	104	A	196	A	104	A	196	A	104	A	196	A	104	A	196	A	0	-	309	A	140	A
318 /3	36	A	48	A	59	A	48	A	59	A	48	A	59	A	48	A	72	A	20	A	73	A	0	-
318 /3	348	A	244	A	307	A	244	A	307	A	244	A	307	A	244	A	380	B	102	A	381	B	14	A
321 351 /1 TOTAL	1,608 2,316 3,924	G	843 2,236 3,079	F	1,337 2,236 3,903	G	1,608 2,316 3,924	G	1,608 2,316 3,924	G	843 2,236 3,079	F	1,208 2,236 3,444	F	420 2,236 2,656	F	1,657 2,236 3,893	G	420 2,236 2,656	F	1,657 2,236 3,893	G	949 2,088 3,037	F

TABLE A-24 (continued)

RANCH SIZE AND USE LEVELS FOR EXISTING, PROPOSED ACTION AND ALTERNATIVES /1

	EE		PA				NA/FE				LA				PCL				ESR				NG	
Ranch /2	Short & Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short Term	R C	Long Term	R C	Short & Long Term	R C
322	2,244	E	1,900	E	2,593	F	2,244	E	2,244	E	1,900	E	2,421	F	1,265	C	3,256	F	854	C	3,342	F	986	C
327	2,220	E	971	C	1,467	D	2,220	E	2,220	E	971	C	1,336	0	768	B	1,822	E	677	B	1,842	E	1,185	C
328	1,189	C	1,013	C	1,770	0	1,189	C	1,189	C	1,013	C	1,580	0	1,013	C	1,770	0	1,013	C	1,770	0	309	A
341 /1	23	A	11	A	11	A	23	A	23	A	11	A	11	A	11	A	11	A	11	A	11	A	-0-	-
342 /1	3,132	F	3,056	F	3,056	F	3,132	F	3,132	F	3,056	F	3,056	F	3,056	F	3,056	F	3,056	F	3,056	F	2,832	F
343 /1	5,400	G	5,277	G	5,277	G	5,400	G	5,400	G	5,277	G	5,277	G	5,277	G	5,277	G	5,277	G	5,277	G	5,133	G
347	84	A	17	A	35	A	84	A	84	A	17	A	30	A	17	A	35	A	17	A	35	A	-0-	-
348	407	B	146	A	293	A	407	B	407	B	146	A	255	A	146	A	293	A	146	A	293	A	-0-	-
350 /1																								
362	6,588		6,552		6,552		6,588		6,588		6,552		6,552		6,552		6,552		6,552		6,552		6,326	
349	228		81		199		228		228		81		168		81		199		81		199		0	
TOTAL	6,816	H	6,633	H	6,751	H	6,816	H	6,816	H	6,633	H	6,720	H	6,633	H	6,751	H	6,633	H	6,751	H	6,326	H
352 /1	1,680	0	1,489	0	1,489	0	1,680	0	1,680	D	1,489	0	1,489	0	1,489	0	1,489	0	1,489	D	1,489	0	1,056	C
353 /1	744	B	601	B	601	B	744	B	744	B	601	B	601	B	601	B	601	B	601	B	601	B	468	B
356 /1	72	A	-0-	-	83	A	72	A	72	A	-0-	-	83	A	-0-	-	83	A	-0-	-	83	A	-0-	-
357	24	A	-0-	-	-0-	-	24	A	24	A	-0-	-	-0-	-	-0-	-	-0-	-	-0-	-	-0-	-	-0-	-
TOTALS	240,977		189,646		246,344		229,305		242,403		189,646		236,689		167,172		278,196		152,086		283,180		132,068	
Percent Change from Existing Environment			-21%		+2%		-5%		+.6%		-21%		-2%		-31%		+15%		-37%		+18%		-45%	

/1 On non-AMP areas, non-public land AUMs were estimated in order to calculate ranch size categories
/2 Totals of individual allotments are calculated by operator
/3 Community allotments with two or more operators

A = Subsistence Small (1-29 AUs)
B = Subsistence Large (30-69 AUs)
C = Small Commercial Small (70-110 AUs)
0 = Small Commercial Medium (111-150 AUs)
E = Small Commercial Large (151-199 AUs)
F = Medium Commercial Small (200-309 AUs)
G = Medium Commercial Large (310-499 AUs)
H = Large (500 or more AUs)

EE - Existing Environment
PA - Proposed Action
NA/FE - No Action Alternative and Future Environment
LA - Livestock Adjustment Alternative
PCL - Pasture Capacity Level Alternative
ESR - Enhancement of Sensitive Resource Values Alternative
NG - No Grazing Alternative
RC - Ranch Size Categories

Source: Table A-1, Table A-18, Range Survey, Wildlife Oata, Socorro Oistrict

APPENDIX 6

SOCIO-ECONOMICS

Methodology

The socio-economic analysis of the impact area is based on studies contracted by BLM to Southwest Research and Oevelopment Company (SRO) (1977). A more detailed explanation of the methodology used in this analysis is available at the BLM Socorro Oistrict Office.

SRD categorized operators into eight size classes based on information supplied by BLM. All of SRO's data on production rates in the report was presented per AU using 1975 cost figures for each ranch size category. The report analyzed the impacts that changes in grazing use would have on income, employment, and population. It was necessary to modify SRD's report to fit the grazing use reductions for the Proposed Action or alternatives. This was accomplished by adjusting SRD's computerized ranch budgets to the actual number and size of operators in the ES Area. For example, SRO's average ranch size for the subsistence small category was 11 AUs; 13 operators were in the subsistence small category. Based on the proposed adjustments for the Proposed Action or alternatives, BLM refigured the number of operators and the average number of AUs in each ranch size category. Therefore, for this example and based on actual data, BLM adjusted the average ranch size for the subsistence small category to 13 AUs; there were 27 operators in that category. Based upon the adjusted ranch size category, AUs, and number of operators BLM modified the net returns per animal unit from the ranch budgets supplied by SRD. BLM then converted these modified budgets from an AU basis to a total ranch income. This equals ranch income for the ranch size category. This process was repeated for the eight different ranch categories for the Proposed Action and alternatives. BLM then calculated total income for the area, based on the Proposed Action or alternatives. The number of operators in each category was multiplied times the income per category. These were added for all eight categories. This sum equals total income in the area for the Proposed Action or alternatives.

Tables A-26 through A-37 (Appendix 6, pp. A-92-103) were derived from the ranch budgets and are the foundation for the socio-economic analysis of this ES.

TABLE A-25

GRAZING DEPENDENCY BY RANCH CATEGORY, 1975

Ranch Category by AUs	Number of Operators	% 1/	Total AUs 2,3/	%	Total AUMs 2,3/	%	Public AUMs 2/	%	Other AUMs 2/	%	% Oependency on Public Land
Total ES Area (EE)	102	101	20,090	100	241,080	100	110,685	100	130,395	100	45
Subsistence Small (1-29 AUs)	27	26	351	2	4,212	2	3,327	3	885	1	79
Subsistence Large (30-69 AUs)	22	22	1,188	6	14,256	6	9,979	9	4,277	3	70
Small Commercial Small (70-110 AUs)	7	7	609	3	7,308	3	4,677	4	2,631	2	64
Small Commercial Medium (111-150 AUs)	5	5	685	3	8,220	3	6,247	6	1,973	2	76
Small Commercial Large (151-199 AUs)	8	8	1,464	7	17,568	7	12,122	11	5,446	4	69
Medium Commercial Small (200-309 AUs)	13	13	3,393	17	40,716	17	20,765	19	19,951	15	51
Medium Commercial Large (310-499 AUs)	7	7	2,793	14	33,516	14	12,066	11	21,450	16	36
Large Commercial Large (500 + AUs)	13	13	9,607	48	115,284	48	41,502	37	73,782	57	35

1/ Does not add to 100 because of rounding
2/ Does not equal other figures in the ES because of averaging and rounding
3/ On non-AMP areas, non-public land AUMs were estimated

EE = Existing Environment

Source: BLM Socorro District Grazing Files and Southwest Research and Oevelopment Co., 1977

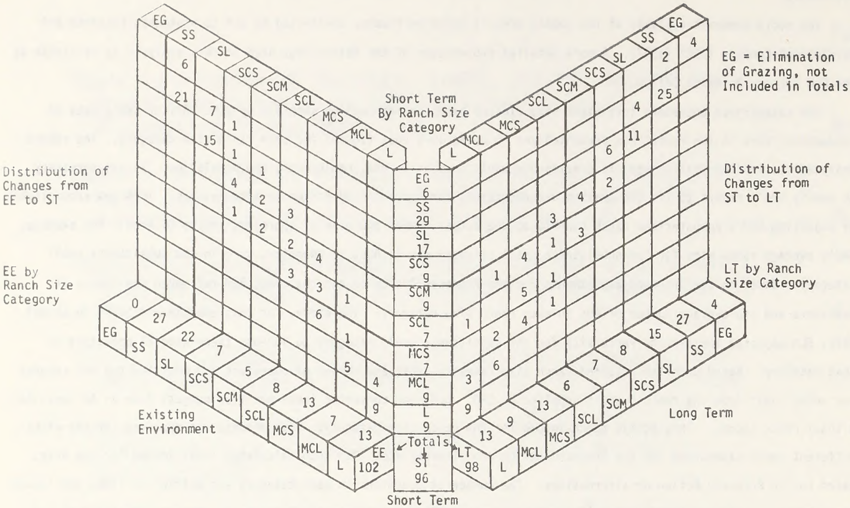


Figure A-11. Short- and long-term changes in the distribution of number of operators in ranch size categories under the Proposed Action

Source: Table 2-26

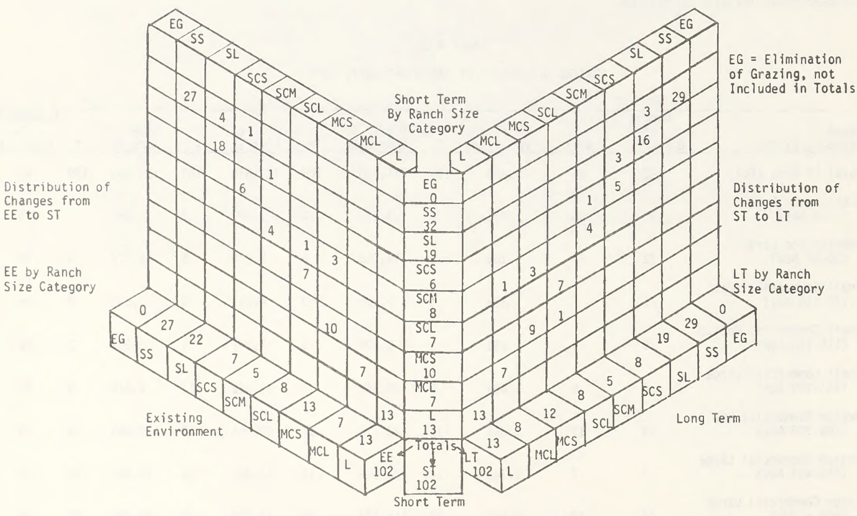


Figure A-12. Short- and long-term changes in the distribution of number of operators in ranch size categories under the No Action Alternative

Source: Table 2-26

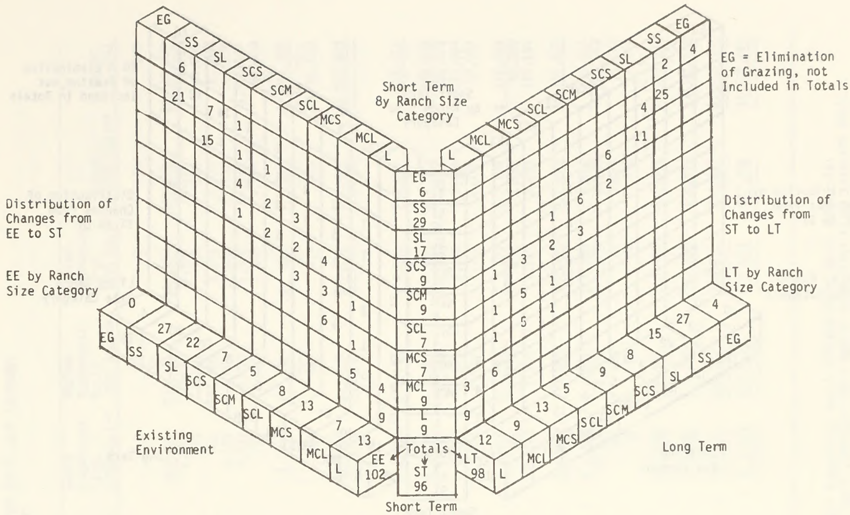


Figure A-13. Short- and long-term changes in the distribution of number of operators in ranch size categories under the Livestock Adjustment Alternative

Source: Table 2-26

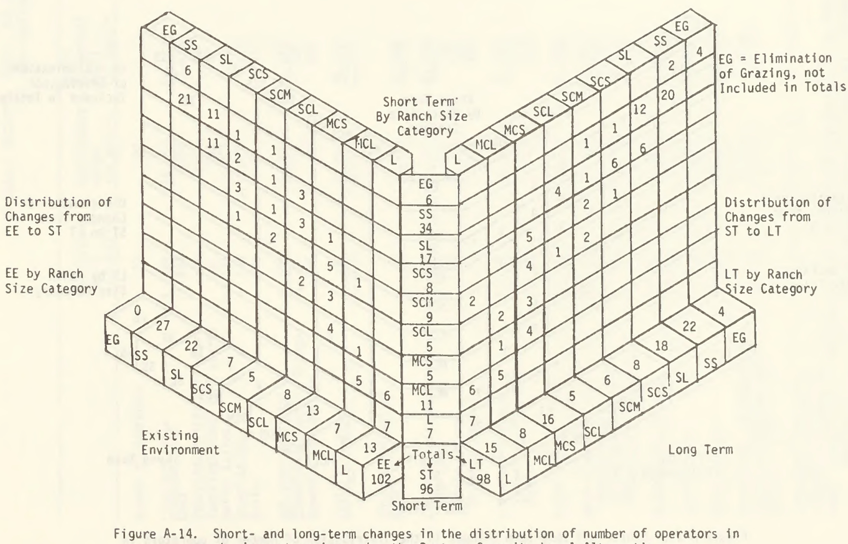


Figure A-14. Short- and long-term changes in the distribution of number of operators in ranch size categories under the Pasture Capacity Level Alternative

Source: Table 2-26

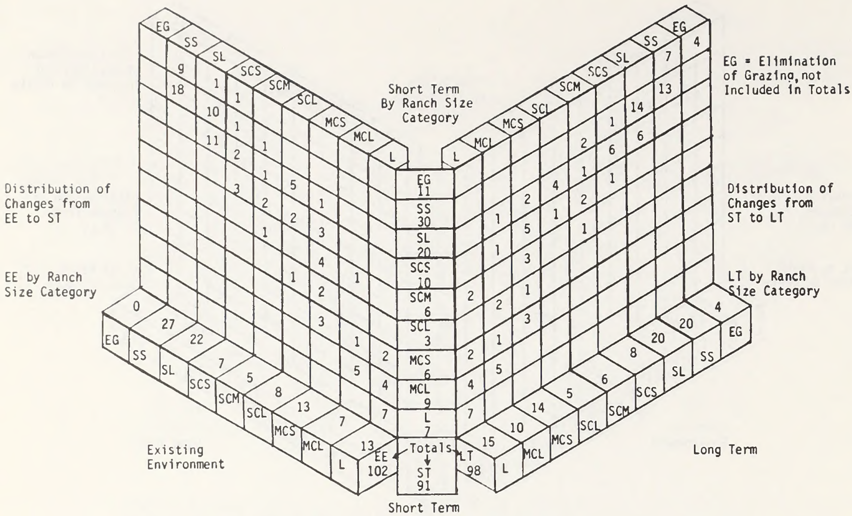


Figure A-15. Short- and long-term changes in the distribution of number of operators in ranch size categories under the Enhancement of Sensitive Resource Values Alternative

Source: Table 2-26

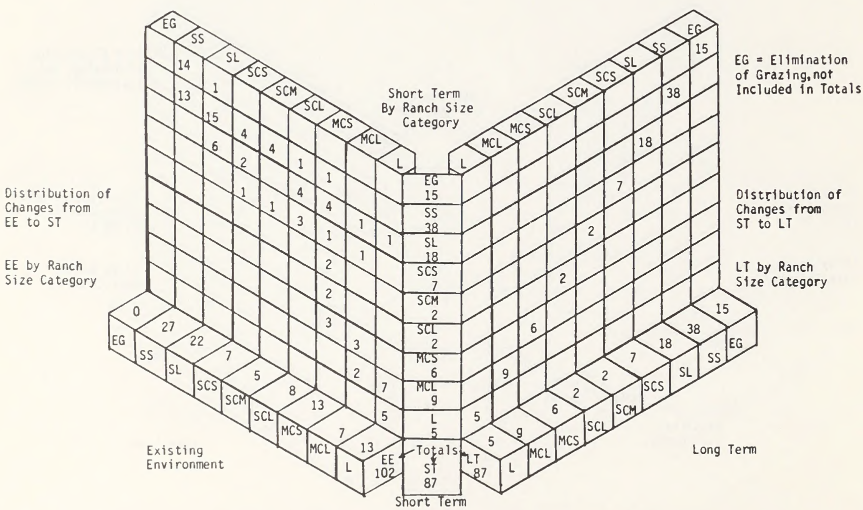


Figure A-16. Short- and long-term changes in the distribution of number of operators in ranch size categories under the No Grazing Alternative

Source: Table 2-26

TABLE A-26

ESTIMATED RECEIPTS, COSTS, AND NET RETURNS PER RANCH SIZE CATEGORY FOR EXISTING ENVIRONMENT

	Subsistence Small (13 AUs)**	Subsistence Large (54 AUs)**	Small Commercial Small (87 AUs)**	Small Commercial Medium (137 AUs)**	Small Commercial Large (183 AUs)**	Medium Commercial Small (261 AUs)**	Medium Commercial Large (399 AUs)**	Large (739 AUs)**	Total ES Area
Number of Operators	27	22	7	5	8	13	7	13	102
CASH RECEIPTS*	$ 489	$4,650	$9,283	$15,650	$21,001	$33,176	$52,357	$98,656	$2,507,057
Cows	234	1,686	2,074	2,615	3,838	8,375	11,455	18,726	534,205
Yearlings Heifer (1-2 years)	-0-	-0-	817	-0-	754	1,107	938	916	44,616
Yearlings Steer (1-2 years)	-0-	-0-	-0-	-0-	430	1,806	2,342	2,904	81,064
Heifer Calves	115	1,079	1,776	4,736	5,479	7,026	13,031	27,432	645,958
Steer Calves	140	1,885	4,174	7,472	9,711	13,400	22,528	44,214	1,096,194
Bulls	-0-	-0-	442	827	789	1,462	2,063	4,464	105,020
NON-CASH RECEIPTS*	$ 289	$ 397	$ 242	$ 381	$ 365	$ 441	$ 814	$ 872	$ 45,823
Livestock Inventory Change	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Domestic Consumption	289	397	242	381	365	441	814	872	45,823
TOTAL RECEIPTS*	$ 778	$5,047	$9,525	$16,031	$21,366	$33,617	$53,171	$99,528	$2,552,880
COST OF OPERATION*									
Feed	$ 68	$ 416	$1,088	$ 1,982	$ 2,871	$ 3,132	$ 4,553	$ 8,011	$ 228,212
Leases/Grazing Fees:	$ 130	$ 756	$1,488	$ 2,615	$ 3,128	$ 4,098	$ 5,881	$ 9,829	$ 290,875
BLM (AUM)	85	461	744	1,302	1,565	1,780	2,322	3,865	126,314
State (Acres)	45	295	522	962	1,096	1,561	2,398	3,806	111,494
Private (Acres)	-0-	-0-	222	351	467	757	1,161	2,158	53,067
Livestock Expenses:	$ 25	$ 103	$ 686	$ 1,370	$ 1,546	$ 2,239	$ 3,372	$ 7,124	$ 172,284
Veterinary/Medicine	25	103	174	274	366	574	878	1,848	46,089
Bulls	-0-	-0-	512	1,096	1,180	1,665	2,494	5,276	126,195
Labor (Hired)	$ 18	$ 211	$ 413	$ 988	$ 1,510	$ 2,589	$ 4,309	$ 7,560	$ 187,139
Other Expenses:	$ 80	$ 404	$ 991	$ 1,887	$ 2,745	$ 2,855	$ 4,088	$ 6,608	$ 201,015
Miscellaneous	66	337	829	1,637	2,408	2,349	3,220	5,203	163,164
Property Tax (land)	13	60	150	225	306	454	780	1,279	34,283
Property Tax (cattle)	1	7	12	25	31	52	88	126	3,568
Machinery/Equipment	$ 391	$1,504	$2,305	$ 3,092	$ 3,762	$ 3,195	$ 4,381	$ 6,843	$ 266,497
Developments	$ 65	$ 322	$1,835	$ 870	$ 1,045	$ 1,195	$ 1,708	$ 5,853	$ 137,974
TOTAL COSTS*	$ 777	$3,716	$8,806	$12,804	$16,607	$19,303	$28,292	$51,828	$1,483,996
NET RETURNS TO OPERATOR LABOR, MANAGEMENT, AND CAPITAL	$ 1	$1,331	$ 719	$ 3,227	$ 4,759	$14,314	$24,879	$47,700	$1,068,884

*Denotes 1975 Dollars
**Denotes Average Ranch Size
Note: Ranch Sizes: Subsistence Small (1-29 AUs); Subsistence Large (30-69 AUs); Small Commercial Small (70-110 AUs); Small Commercial Medium (111-150 AUs); Small Commercial Large (151-199 AUs); Medium Commercial Small (200-309 AUs); Medium Commercial Large (310-499 AUs); Large (500+ AUs)

Source: BLM Socorro District Grazing Files and Southwest Research and Development Co., 1977

TABLE A-27

ESTIMATED RECEIPTS, COSTS, AND NET RETURNS PER RANCH SIZE CATEGORY
FOR PROPOSED ACTION AND LIVESTOCK ADJUSTMENT ALTERNATIVE IN THE SHORT TERM

	Subsistence Small (13 AUs)**	Subsistence Large (46 AUs)**	Small Commercial Small (85 AUs)**	Small Commercial Medium (137 AUs)**	Small Commercial Large (172 AUs)**	Medium Commercial Small (253 AUs)**	Medium Commercial Large (412 AUs)**	Large (663 AUs)**	Total ES Area
Number of Operators	29	17	9	9	7	7	9	9	96
Livestock Adjustments From Existing Environment	+10%	-30%	+30%	+80%	-20%	-50%	+30%	-40%	
CASH RECEIPTS*	$651	$3,106	$11,974	$16,080	$20,690	$31,528	$54,895	$88,421	$1,979,537
Cows	234	1,203	5,223	2,652	3,844	8,476	12,063	16,423	440,726
Yearling Heifers (1-2 Years)	-0-	-0-	593	-0-	776	390	968	872	30,059
Yearling Steers (1-2 Years)	-0-	-0-	-0-	-0-	686	1,402	1,838	2,281	51,687
Heifer Calves	134	598	1,727	4,736	5,220	6,775	13,456	24,895	501,343
Steer Calves	283	1,305	4,028	7,806	8,903	12,739	23,904	39,090	855,338
Bulls	-0-	-0-	403	886	1,261	1,746	2,666	4,860	100,384
Horses	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
NON-CASH RECEIPTS*	$134	$ 367	$ 359	$ 364	$ 392	$ 531	$ 782	$ 948	$ 38,663
Livestock Inventory Change	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Oomestic Consumption	134	367	359	364	392	531	782	948	38,663
TOTAL RECEIPTS*	$785	$3,473	$12,333	$16,444	$21,082	$32,059	$55,677	$89,369	$2,018,200
COST OF OPERATION*									
Feed	$ 68	$ 354	$ 1,063	$ 1,982	$ 2,699	$ 3,036	$ 4,701	$ 7,187	$ 182,532
Lease/Grazing Fees:	$123	$ 816	$ 1,756	$ 2,031	$ 3,306	$ 6,201	$ 5,224	$12,325	$ 276,012
BLM (AUMs)	85	393	727	1,302	1,471	1,725	2,398	3,467	102,564
State (Acres)	38	423	722	534	1,288	3,016	1,903	5,689	118,053
Private (Acres)	-0-	-0-	307	195	547	1,460	923	3,169	55,395
Livestock Expenses:	$ 25	$ 87	$ 878	$ 1,188	$ 1,732	$ 2,702	$ 3,877	$ 6,922	$ 149,027
Veterinary/Medicine	25	87	170	274	344	557	906	1,658	35,583
8ulls	-0-	-0-	708	914	1,388	2,145	2,971	5,264	113,444
Labor (Hired)	$ 18	$ 179	$ 412	$ 988	$ 1,419	$ 2,510	$ 4,450	$ 6,782	$ 144,756
Other Expenses:	$ 78	$ 379	$ 942	$ 1,787	$ 2,653	$ 3,206	$ 4,034	$ 6,703	$ 170,912
Miscellaneous	66	287	725	1,637	2,264	2,277	3,325	4,668	131,775
Property Tax (Land)	11	86	207	125	358	878	618	1,909	36,164
Property Tax (Cattle)	1	6	10	25	31	51	91	126	2,973
Machinery/Equipment	$375	$1,509	$ 2,496	$ 2,735	$ 3,767	$ 3,891	$ 4,252	$ 7,207	$ 240,344
Developments	$ 55	$ 462	$ 2,540	$ 484	$ 1,226	$ 2,307	$ 1,355	$ 8,752	$ 152,359
TOTAL COST*	$742	$3,786	$10,087	$11,195	$16,802	$23,853	$27,893	$55,878	$1,315,942
NET RETURNS TO OPERATOR LA8OR, MANAGEMENT, ANO CAPITAL	$ 43	-$ 313	$ 2,246	$ 5,249	$ 4,280	$ 8,206	$27,784	$33,442	$ 702,258

*Denotes 1975 Dollars
**Denotes Average Ranch Size
Note: Ranch Sizes: Subsistence Small (1-29 AUs); Subsistence Large (30-69 AUs); Small Commercial Small (70-110 AUs); Small Commercial Medium (111-150 AUs); Small Commercial Large (151-199 AUs); Medium Commercial Small (200-309 AUs); Medium Commercial Large (310-499 AUs); Large (500+ AUs)

Source: 8LM Socorro Oistrict Grazing Files and Southwest Research and Development Co., 1977

TABLE A-28

ESTIMATED RECEIPTS, COSTS, AND NET RETURNS PER RANCH SIZE CATEGORY
FOR NO ACTION ALTERNATIVE IN THE SHORT TERM

	Subsistence Small (13 AUs)**	Subsistence Large (51 AUs)**	Small Commercial Small (87 AUs)**	Small Commercial Medium (143 AUs)**	Small Commercial Large (181 AUs)**	Medium Commercial Small (254 AUs)**	Medium Commercial Large (414 AUs)**	Large (727 AUs)**	Total ES Area
Number of Operators	32	19	6	8	7	10	7	13	102
Livestock Adjustments From Existing Environment	+20%	-20%	-10%	+70%	-10%	-30%	0%	0%	
CASH RECEIPTS*	$ 752	$ 4,018	$ 8,893	$17,225	$21,445	$31,586	$54,263	$ 97,076	$2,399,368
Cows	236	1,692	2,005	2,881	3,844	8,151	11,770	18,517	506,307
Yearlings Heifer (1-2 Years)	-0-	-0-	590	-0-	959	930	973	952	38,740
Yearlings Steer (1-2 Years)	-0-	872	-0-	-0-	679	1,819	2,331	2,835	92,683
Heifer Calves	233	1,454	1,854	4,866	5,345	6,734	13,459	27,001	635,115
Steer Calves	283	-0-	4,032	8,668	9,369	12,748	23,590	43,700	1,028,885
Bulls	-0-	-0-	412	810	1,249	1,204	2,140	4,071	97,638
NON-CASH RECEIPTS*	$ 141	$ 270	$ 271	$ 350	$ 360	$ 470	$ 675	$ 858	$ 37,167
Livestock Inventory Change	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Domestic Consumption	141	270	271	350	360	470	675	858	37,167
TOTAL RECEIPTS*	$ 893	$ 4,288	$ 9,164	$17,575	$21,805	$32,056	$54,938	$ 97,934	$2,436,535
COST OF OPERATION*									
Feed	$ 68	$ 393	$ 1,088	$ 2,069	$ 2,840	$ 3,048	$ 4,724	$ 7,881	$ 218,604
Leases/Grazing Fees:	$ 123	$ 780	$ 1,564	$ 2,163	$ 3,258	$ 4,945	$ 6,102	$ 9,669	$ 286,111
BLM (AUMs)	85	436	744	1,359	1,548	1,732	2,409	3,802	120,785
State (Acres)	38	344	576	589	1,200	2,164	2,488	3,744	112,048
Private (Acres)	-0-	-0-	244	215	510	1,049	1,205	2,123	53,278
Livestock Expenses:	$ 25	$ 97	$ 739	$ 1,293	$ 1,654	$ 2,098	$ 3,499	$ 7,009	$ 165,589
Veterinary/Medicine	25	-0-	174	286	366	559	911	1,818	42,267
Bulls	-0-	97	565	1,007	1,292	1,539	2,588	5,191	123,322
Labor (Hired)	$ 18	$ 199	$ 413	$ 1,031	$ 1,493	$ 2,520	$ 4,471	$ 7,437	$ 178,712
Other Expenses:	$ 78	$ 394	$ 1,006	$ 1,872	$ 2,750	$ 2,967	$ 4,239	$ 6,514	$ 194,269
Miscellaneous	66	318	829	1,709	2,382	2,286	3,341	5,118	156,255
Property Tax (land)	11	70	165	137	335	630	807	1,258	34,416
Property Tax (cattle)	1	6	12	26	33	51	91	138	3,598
Machinery/Equipment	$ 375	$ 1,507	$ 2,367	$ 2,880	$ 3,825	$ 3,449	$ 4,546	$ 6,732	$ 258,478
Improvements	$ 55	$ 376	$ 2,026	$ 533	$ 1,144	$ 1,659	$ 1,772	$ 5,758	$ 137,180
TOTAL COSTS*	$ 742	$ 3,746	$ 9,203	$11,841	$16,964	$20,686	$29,353	$ 51,000	$1,438,943
NET RETURNED TO OPERATOR LABOR, MANAGEMENT AND CAPITAL	$ 151	$ 542	-$ 39	$ 5,734	$ 4,841	$11,370	$25,585	$ 46,934	$ 997,592

*Denotes 1975 Dollars
**Denotes Average Ranch Size
Note: Ranch Sizes: Subsistence Small (1-29 AUs); Subsistence Large (30-69 AUs); Small Commercial Small (70-110 AUs); Small Commercial Medium (111-150 AUs); Small Commercial Large (151-199 AUs); Medium Commercial Small (200-309 AUs); Medium Commercial Large (310-499 AUs); Large (500+ AUs)

Source: BLM Socorro District Grazing Files and Southwest Research and Development Co., 1977

TABLE A-29

.ESTIMATED RECEIPTS, COSTS, AND NET RETURNS PER RANCH SIZE CATEGORY
FOR PASTURE CAPACITY LEVEL ALTERNATIVE IN THE SHORT TERM

	Subsistence Small (12 AUs)**	Subsistence Large (47 AUs)**	Small Commercial Small (91 AUs)**	Small Commercial Medium (125 AUs)**	Small Commercial Large (177 AUs)**	Medium Commercial Small (250 AUs)**	Medium Commercial Large (392 AUs)**	Large (630 AUs)**	Total ES Area
Number of Operators	34	17	8	9	5	5	11	7	96
Livestock Adjustments For Existing Environment	+20%	+30%	+20%	+60%	-40%	-60%	+50%	-50%	
CASH RECEIPTS*	$ 753	$3,187	$9,476	$14,157	$19,787	$30,462	$52,534	$82,480	$1,689,481
Cows	236	1,297	2,260	2,386	3,565	8,163	11,478	15,202	360,839
Yearling Heifers (1-2 Years)	-0-	-0-	781	-0-	798	965	768	1,235	32,156
Yearling Steers (1-2 Years)	-0-	-0-	-0-	-0-	956	1,155	1,654	1,966	42,511
Heifer Calves	234	646	1,725	4,339	5,227	6,628	12,875	23,108	434,445
Steer Calves	283	1,244	4,325	7,001	8,402	12,258	23,222	36,660	743,741
Bulls	-0-	-0-	385	431	839	1,293	2,537	4,309	75,689
NON-CASH RECEIPTS*	$ 141	$ 411	$ 455	$ 398	$ 425	$ 563	$ 800	$ 1,008	$ 39,799
Livestock Inventory Change	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Domestic Consumption	141	411	455	398	425	563	800	1,008	39,799
TOTAL RECEIPTS*	$ 894	$3,598	$9,931	$14,555	$20,212	$31,025	$53,334	$83,488	$1,729,280
COST OF OPERATION*									
Feed	$ 63	$ 362	$1,138	$ 1,809	$ 2,777	$ 3,000	$ 4,483	$ 6,829	$ 159,682
Lease/Grazing Fees:	$ 113	$ 767	$1,425	$ 1,933	$ 4,029	$ 7,255	$ 4,557	$13,463	$ 246,466
BLM (AUMs)	78	402	778	1,188	1,513	1,705	2,221	3,295	89,988
State (Acres)	35	365	454	546	1,766	3,740	1,572	6,489	106,186
Private (Acres)	-0-	-0-	193	199	750	1,810	764	3,679	50,292
Livestock Expenses:	$ 23	$ 90	$ 628	$ 873	$ 1,306	$ 1,880	$ 3,721	$ 6,577	$ 118,093
Veterinary/Medicine	23	90	182	250	354	550	863	1,575	31,056
Bulls	-0-	-0-	446	623	952	1,330	2,858	5,002	87,037
Labor (Hired)	$ 17	$ 184	$ 432	$ 901	$ 1,460	$ 2,480	$ 4,233	$ 6,445	$ 126,649
Other Expenses:	$ 72	$ 374	$1,010	$ 1,645	$ 2,853	$ 3,390	$ 3,760	$ 6,735	$ 151,411
Miscellaneous	61	294	867	1,494	2,329	2,250	3,164	4,435	116,198
Property Tax (land)	10	75	130	128	492	1,090	510	2,180	32,587
Property Tax (cattle)	1	5	13	23	32	50	86	120	2,626
Machinery/Equipment	$ 346	$1,453	$2,307	$ 2,544	$ 4,269	$ 4,248	$ 3,932	$ 7,352	$ 215,118
Developments	$ 51	$ 400	$1,600	$ 494	$ 1,685	$ 2,863	$ 1,117	$ 9,979	$ 130,660
TOTAL COST*	$ 685	$3,630	$8,540	$10,199	$18,379	$25,116	$25,803	$57,380	$1,148,079
NET RETURNS TO OPERATOR, LABOR, MANAGEMENT, AND CAPITAL	$ 209	-$ 32	$1,391	$ 4,356	$ 1,833	$ 5,909	$27,531	$26,108	$ 581,201

*Denotes 1975 Dollars
**Denotes Average Ranch Size
Note: Ranch Sizes: Subsistence Small (1-29 AUs); Subsistence Large (30-69 AUs); Small Commercial Small (70-110 AUs); Small Commercial Medium (111-150 AUs); Small Commercial Large (151-199 AUs); Medium Commercial Small (200-309 AUs); Medium Commercial Large (310-499 AUs); Large (500+ AUs)

Source: BLM Socorro District Grazing Files and Southwest Research and Development Co., 1977

TABLE A-30

ESTIMATED RECEIPTS, COSTS, AND NET RETURNS PER RANCH SIZE CATEGORY
FOR THE ENHANCEMENT OF SENSITIVE RESOURCE VALUES ALTERNATIVE IN THE SHORT TERM

	Subsistence Small (10 AUs)**	Subsistence Large (44 AUs)**	Small Commercial Small (87 AUs)**	Small Commercial Medium (125 AUs)**	Small Commercial Large (180 AUs)**	Medium Commercial Small (265 AUs)**	Medium Commercial Large (383 AUs)**	Large (614 AUs)**	Total ES Area
Number of Operators	30	20	10	6	3	6	9	7	91
Livestock Adjustments From Existing Environment	-10%	-30%	+40%	+10%	-60%	-50%	+30%	-60%	
CASH RECEIPTS*	$ 378	$2,983	$9,092	$14,589	$20,819	$33,764	$51,994	$80,955	$1,549,126
Cows	237	1,214	2,005	2,386	4,138	9,007	11,258	15,761	343,861
Yearling Heifers (1-2 Years)	-0-	-0-	780	-0-	1,177	387	980	411	25,350
Yearling Steers (1-2 Years)	-0-	-0-	-0-	-0-	1,408	1,617	1,642	1,719	40,737
Heifer Calves	117	604	1,721	4,339	5,220	7,179	12,771	22,964	389,745
Steer Calves	141	1,165	4,174	7,001	7,582	13,417	22,756	35,790	669,858
Bulls	-0-	-0-	412	863	1,294	2,157	2,587	4,310	79,575
Horses	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
NON-CASH RECEIPTS*	$ 141	$ 385	$ 367	$ 398	$ 412	$ 562	$ 819	$ 1,013	$ 37,058
Livestock Inventory Change	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Domestic Consumption	141	385	367	398	412	562	819	1,013	37,058
TOTAL RECEIPTS*	$ 519	$3,368	$9,459	$14,987	$21,231	$34,326	$52,813	$81,968	$1,586,184
COST OF OPERATION*									
Feed	$ 53	$ 339	$1,088	$1,809	$ 2,824	$ 3,180	$ 4,473	$ 6,656	$ 144,505
Leases/Grazing Fees:	$ 103	$ 718	$1,274	$2,273	$ 5,379	$ 6,495	$ 4,970	$15,601	$ 252,872
BLM (AUMs)	65	376	744	1,188	1,539	1,807	2,281	3,211	82,503
State (Acres)	38	342	372	795	2,695	3,159	1,811	7,908	115,164
Private (Acres)	-0-	-0-	158	290	1,145	1,529	878	4,482	55,205
Livestock Expenses:	$ 19	$ 84	$ 539	$1,156	$ 1,813	$ 2,830	$ 3,688	$ 6,410	$ 115,057
Veterinary/Medicine	19	84	174	250	360	583	862	1,535	28,571
Bulls	-0-	-0-	365	906	1,453	2,247	2,826	4,875	86,486
Labor (Hired)	$ 14	$ 172	$ 413	$ 901	$ 1,485	$ 2,629	$ 4,234	$ 6,281	$ 115,698
Other Expenses:	$ 62	$ 350	$ 948	$1,702	$ 3,152	$ 3,358	$ 3,837	$ 7,099	$ 140,522
Miscellaneous	51	275	829	1,494	2,369	2,385	3,163	4,323	102,899
Property Tax (Land)	10	70	107	185	751	920	588	2,569	35,258
Property Tax (Cattle)	1	5	12	23	32	53	86	117	2,365
Machinery/Equipment	$ 301	$1,360	$2,134	$2,753	$ 5,143	$ 4,076	$ 4,045	$ 7,908	$ 196,704
Developments	$ 50	$ 374	$1,311	$ 719	$ 2,569	$ 2,417	$ 1,290	$12,157	$ 143,822
TOTAL COSTS*	$ 189	$3,397	$7,707	$11,313	$22,365	$24,985	$26,537	$62,112	$1,109,180
NET RETURNS TO OPERATOR LABOR, MANAGEMENT, AND CAPITAL	$ 330	-$ 29	$1,752	$ 3,674	-$ 1,134	$ 9,341	$26,276	$19,856	$ 477,004

*Denotes 1975 Dollars
**Denotes Average Ranch Size
Note: Ranch Sizes: Subsistence Small (1-29 AUs); Subsistence Large (30-69 AUs); Small Commercial Small (70-110 AUs); Small Commercial Medium (111-150 AUs); Small Commercial Large (151-199 AUs); Medium Commercial Small (200-309 AUs); Medium Commercial Large (310-499 AUs); Large (500+ AUs)

Source: BLM Socorro District Grazing Files and Southwest Research and Development Co., 1977

TABLE A-31

ESTIMATED RECEIPTS, COSTS, AND NET RETURNS PER RANCH SIZE CATEGORY
FOR NO GRAZING ALTERNATIVE IN THE SHORT TERM

	Subsistence Small (10 AUs)**	Subsistence Large (46 AUs)**	Small Commercial Small (89 AUs)**	Small Commercial Medium (129 AUs)**	Small Commercial Large (193 AUs)**	Medium Commercial Small (249 AUs)**	Medium Commercial Large (415 AUs)**	Large (671 AUs)**	Total ES Area
Number of Operators	38	18	7	2	2	6	9	5	87
Livestock Adjustments From Existing Environment	+10%	-30%	0	-60%	-70%	-60%	+30%	-70%	
CASH RECEIPTS*	$ 637	$3,128	$9,241	$14,534	$21,852	$30,374	$55,212	$87,083	$1,332,536
Cows	237	1,213	2,007	2,121	4,420	8,163	12,077	16,809	299,687
Yearling Heifers (1-2 Years)	-0-	-0-	781	592	795	965	979	832	27,002
Yearling Steers (1-2 Years)	-0-	-0-	-0-	-0-	1,857	1,150	1,872	1,651	35,717
Heifer Calves	117	604	1,853	4,198	5,620	6,601	13,612	25,102	335,549
Steer Calves	283	1,311	4,178	6,343	7,413	12,208	24,091	38,059	571,472
Bulls	-0-	-0-	422	1,280	1,747	1,287	2,581	4,630	63,109
Horses	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
NON-CASH RECEIPTS*	$ 141	$ 385	$ 376	$ 410	$ 384	$ 561	$ 813	$ 560	$ 29,991
Livestock Inventory Change	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Domestic Consumption	141	385	376	410	384	561	813	560	29,991
TOTAL RECEIPTS*	$ 778	$3,513	$9,617	$14,944	$22,236	$30,935	$56,025	$87,643	$1,362,527
COST of OPERATION*									
Feed	$ 53	$ 354	$1,113	$1,867	$ 3,028	$ 2,988	$ 4,735	$ 7,274	$ 122,880
Lease/Grazing Fees:	$ 97	$ 751	$1,521	$4,317	$ 7,081	$ 7,226	$ 5,262	$21,559	$ 249,156
BLM (AUMs)	65	393	761	1,226	1,650	1,698	2,415	3,509	70,091
State (Acres)	32	358	533	2,265	3,812	3,725	1,917	11,521	120,753
Private (Acres)	-0-	-0-	227	826	1,619	1,803	930	6,529	58,312
Livestock Expenses:	$ 19	$ 87	$ 701	$1,548	$ 2,440	$ 1,873	$ 3,905	$ 7,006	$ 96,584
Veterinary/Medicine	19	87	178	258	386	548	913	1,678	24,717
Bulls	-0-	-0-	523	1,290	2,054	1,325	2,992	5,328	71,867
Labor (Hired)	$ 14	$ 179	$ 423	$ 930	$ 1,592	$ 2,470	$ 4,482	$ 6,864	$ 101,237
Other Expenses:	$ 61	$ 366	$1,013	$2,093	$ 3,637	$ 3,377	$ 4,038	$ 8,723	$ 127,676
Miscellaneous	51	287	848	1,542	2,540	2,241	3,349	4,724	88,411
Property Tax (Land)	9	73	153	528	1,062	1,086	598	3,872	37,165
Property Tax (Cattle)	1	6	12	23	35	50	91	127	2,100
Machinery/Equipment	$ 294	$1,422	$2,358	$4,049	$ 6,336	$ 4,231	$ 4,250	$ 9,984	$ 187,600
Developments	$ 46	$ 391	$1,877	$2,049	$ 3,634	$ 2,852	$ 1,316	$17,714	$ 150,817
TOTAL COST*	$ 584	$3,550	$9,006	$16,853	$27,748	$25,017	$27,988	$79,124	$1,035,950
NET RETURNS TO OPERATOR LABOR, MANAGEMENT AND CAPITAL	$ 194	-$ 37	$ 611	-$1,909	-$5,512	$ 5,918	$28,037	$ 8,519	$ 326,577

*Denotes 1975 Dollars
**Denotes Average Ranch Size
Note: Ranch Sizes: Subsistence Small (1-29 AUs); Subsistence Large (30-69 AUs); Small Commercial Small (70-110 AUs); Small Commercial Medium (111-150 AUs); Small Commercial Large (151-199 AUs); Medium Commercial Small (200-309 AUs); Medium Commercial Large (310-499 AUs); Large (500+ AUs)

Source: BLM Socorro District Grazing Files and Southwest Research and Development Co., 1977

TABLE A-32

ESTIMATED RECEIPTS, COSTS, AND NET RETURNS PER RANCH SIZE CATEGORY FOR PROPOSED ACTION IN THE LONG TERM

	Subsistence Small (15 AUs)**	Subsistence Large (51 AUs)**	Small Commercial Small (86 AUs)**	Small Commercial Medium (126 AUs)**	Small Commercial Large (173 AUs)**	Medium Commercial Small (254 AUs)**	Medium Commercial Large (412 AUs)**	Large (745 AUs)**	Total ES Area
Number of Operators	27	15	8	7	6	13	9	13	98
Livestock Adjustments From Existing Environment	+20%	-40%	0%	+30%	-30%	0%	+30%	0%	
CASH RECEIPTS*	$749	$5,400	$9,241	$12,932	$11,446	$32,916	$55,228	$ 99,502	$2,552,837
Cows	234	2,827	2,007	2,373	2,005	8,310	12,063	18,662	552,623
Yearling Heifers (1-2 Years)	-0-	-0-	781	-0-	543	1,098	968	976	45,180
Yearling Steers (1-2 Years)	-0-	-0-	-0-	-0-	406	1,792	1,838	2,906	80,052
Heifer Calves	233	890	1,853	4,322	2,900	6,970	13,753	27,669	656,203
Steer Calves	282	1,683	4,178	5,422	4,847	13,295	24,118	44,700	1,104,316
Bulls	-0-	-0-	442	815	745	1,451	2,488	4,589	114,463
Horses	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
NON-CASH RECEIPTS*	$140	$ 388	$ 376	$ 350	$ 344	$ 438	$ 672	$ 879	$ 40,291
Livestock Inventory Change	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Domestic Consumption	140	388	376	350	344	438	672	879	40,291
TOTAL RECEIPTS*	$889	$5,788	$9,617	$13,282	$11,790	$33,354	$55,900	$100,381	$2,983,128
COST OF OPERATION*									
Feed	$ 79	$ 393	$1,113	$ 1,823	$ 2,715	$ 3,108	$ 4,701	$ 8,076	$ 233,684
Lease/Grazing Fees:	$142	$ 905	$1,521	$ 2,123	$ 3,579	$ 4,066	$ 5,224	$ 9,908	$ 294,590
BLM (AUMs)	98	436	761	1,197	1,480	1,766	2,398	3,896	127,721
State (Acres)	44	469	533	679	1,472	1,549	1,903	3,837	113,317
Private (Acres)	-0-	-0-	227	247	627	751	923	2,175	53,652
Livestock Expenses:	$ 29	$ 97	$ 701	$ 1,026	$ 1,932	$ 2,222	$ 3,877	$ 7,182	$ 182,988
Veterinary/Medicine	29	97	178	252	346	510	906	1,863	46,505
Bulls	-0-	-0-	523	774	1,586	1,652	2,971	5,319	136,480
Labor (Hired)	$ 21	$ 199	$ 423	$ 908	$ 1,427	$ 2,569	$ 4,450	$ 7,621	$ 194,374
Other Expenses:	$ 91	$ 421	$1,013	$ 1,687	$ 2,718	$ 2,834	$ 4,034	$ 6,676	$ 204,942
Miscellaneous	76	319	848	1,506	2,277	2,331	3,325	5,246	166,251
Property Tax (Land)	13	96	153	158	410	451	618	1,289	34,763
Property Tax (Cattle)	2	6	12	23	31	52	91	142	3,928
Machinery/Equipment	$433	$1,672	$2,358	$ 2,671	$ 3,946	$ 3,170	$ 4,252	$ 6,899	$ 267,173
Developments	$ 63	$ 512	$1,877	$ 614	$ 1,405	$ 1,186	$ 1,355	$ 5,900	$ 141,438
TOTAL COSTS*	$858	$4,199	$9,006	$10,852	$17,722	$19,055	$ 27,893	$ 52,262	$1,519,186
NET RETURNS TO OPERATOR LABOR, MANAGEMENT AND CAPITAL	$ 31	$1,589	$ 619	$ 2,430	-$ 5,932	$14,259	$ 28,007	$ 48,119	$1,073,942

*Denotes 1975 Dollars

**Denotes Average Ranch Size

Note: Ranch Sizes: Subsistence Small (1-29 AUs); Subsistence Large (30-69 AUs); Small Commercial Small (70-110 AUs); Small Commercial Medium (111-150 AUs); Small Commercial Large (151-199 AUs); Medium Commercial Small (200-309 AUs); Medium Commercial Large (310-499 AUs); Large (500+ AUs)

Source: BLM Socorro District Grazing Files and Southwest Research and Development Co., 1977

TABLE A-33

ESTIMATED RECEIPTS, COSTS, AND NET RETURNS PER RANCH SIZE CATEGORY
FOR NO ACTION ALTERNATIVE IN THE LONG TERM

	Subsistence Small (13 AUs)**	Subsistence Large (52 AUs)**	Small Commercial Small (92 AUs)**	Small Commercial Medium (134 AUs)**	Small Commercial Large (181 AUs)**	Medium Commercial Small (253 AUs)**	Medium Commercial Large (397 AUs)**	Large (746 AUs)**	Total ES Area
Number of Operators	29	19	8	5	8	12	8	13	102
Livestock Adjustments from Existing Environment	+10%	-20%	+20%	0%	0%	-10%	-10%	0%	
CASH RECEIPTS*	$ 651	$3,978	$11,610	$15,342	$21,358	$32,359	$51,980	$ 99,502	$2,532,589
Cows	234	1,687	2,774	2,629	3,844	8,119	11,176	18,687	534,695
Yearlings Heifer (1-2 years)	-0-	-0-	991	-0-	1,171	926	1,167	925	49,769
Yearlings Steer (1-2 years)	-0-	-0-	-0-	-0-	467	1,928	2,330	2,932	83,628
Heifer Calves	134	839	2,222	4,596	5,470	6,742	12,736	27,692	647,131
Steer Calves	283	1,452	5,226	7,308	9,548	12,572	22,002	44,760	1,099,287
Bulls	-0-	-0-	397	809	858	2,072	2,569	4,506	118,079
NON-CASH RECEIPTS*	$ 134	$ 276	$ 547	$ 360	$ 541	$ 468	$ 750	$ 880	$ 42,690
Livestock Inventory Change	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Domestic Consumption	134	276	547	360	541	468	750	880	42,690
TOTAL RECEIPTS*	$ 785	$4,254	$12,157	$15,702	$21,899	$32,827	$52,730	$100,382	$2,575,279
COST OF OPERATION*									
Feed	$ 68	$ 400	$ 1,150	$ 1,939	$ 2,840	$ 3,036	$ 4,530	$ 8,087	$ 228,990
Leases/Grazing Fees:	$ 123	$ 794	$ 1,441	$ 2,557	$ 3,094	$ 4,214	$ 6,245	$ 9,922	$ 297,232
BLM (AUM)	85	444	787	1,273	1,548	1,725	2,311	3,902	125,860
State (Acres)	38	350	459	941	1,084	1,677	2,652	3,842	116,087
Private (Acres)	-0-	-0-	195	343	462	812	1,282	2,178	55,285
Livestock Expenses:	$ 25	$ 99	$ 635	$ 1,340	$ 1,529	$ 2,348	$ 3,628	$ 7,191	$ 177,301
Veterinary/Medicine	25	99	184	268	362	557	873	1,865	46,227
Bulls	-0-	-0-	451	1,072	1,167	1,791	2,755	5,326	131,074
Labor (Hired)	$ 18	$ 203	$ 437	$ 966	$ 1,493	$ 2,510	$ 4,288	$ 7,632	$ 188,289
Other Expenses:	$ 78	$ 402	$ 1,022	$ 1,845	$ 2,717	$ 2,816	$ 4,152	$ 6,685	$ 202,950
Miscellaneous	66	325	877	1,601	2,382	2,277	3,204	5,252	163,398
Property Tax (land)	11	71	132	220	302	488	861	1,291	35,767
Property Tax (cattle)	1	6	13	24	33	51	87	142	3,785
Machinery/Equipment	$ 375	$1,536	$ 2,332	$ 3,024	$ 3,721	$ 3,183	$ 4,486	$ 6,908	$ 267,491
Developments	$ 55	$ 383	$ 1,617	$ 851	$ 1,034	$ 1,285	$ 1,890	$ 5,908	$ 141,679
TOTAL COSTS*	$ 742	$3,817	$ 8,634	$12,522	$16,428	$19,392	$29,219	$ 52,333	$1,503,932
NET RETURNS TO OPERATOR LABOR, MANAGEMENT AND CAPITAL	$ 43	$ 437	$ 3,523	$ 3,180	$ 5,471	$13,435	$23,511	$ 48,049	$1,071,347

*Denotes 1975 Dollars
**Denotes Average Ranch Size
Note: Ranch Sizes: Subsistence Small (1-29 AUs); Subsistence Large (30-69 AUs); Small Commercial Small (70-110 AUs); Small Commercial Medium (111-150 AUs); Small Commercial Large (151-199 AUs); Medium Commercial Small (200-309 AUs); Medium Commercial Large (310-499 AUs); Large (500+ AUs)

Source: BLM Socorro District Grazing Files and Southwest Research and Development Co., 1977

TABLE A-34

ESTIMATED RECEIPTS, COSTS, AND NET RETURNS PER RANCH SIZE CATEGORY
FOR LIVESTOCK ADJUSTMENT ALTERNATIVE IN THE LONG TERM

	Subsistence Small (15 AUs)**	Subsistence Large (51 AUs)**	Small Commercial Small (86 AUs)**	Small Commercial Medium (124 AUs)**	Small Commercial Large (180 AUs)**	Medium Commercial Small (257 AUs)**	Medium Commercial Large (415 AUs)**	Large (691 AUs)**	Total ES Area
Number of Operators	27	15	8	9	5	13	9	12	98
Livestock Adjustments From Existing Environment	+20%	-40%	+20%	+60%	-40%	0%	+40%	-10%	
CASH RECEIPTS*	$ 746	$ 5,485	$ 8,856	$13,983	$26,311	$33,706	$54,901	$ 92,075	$2,467,854
Cows	234	2,901	2,026	2,367	9,867	7,597	11,994	17,150	549,186
Yearlings-Heifers (1-2 years)	-0-	-0-	789	-0-	776	555	1,141	1,140	41,356
Yearlings-Steers (1-2 years)	-0-	-0-	-0-	-0-	929	1,388	1,556	2,716	69,285
Heifer Calves	230	841	1,609	4,204	5,341	8,394	13,612	25,249	630,856
Steer Calves	282	1,743	4,024	6,985	8,545	14,554	24,091	41,094	1,070,690
Bulls	-0-	-0-	408	427	853	1,218	2,507	4,726	106,481
Horses	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
NON-CASH RECEIPTS*	$ 140	$ 368	$ 363	$ 405	$ 808	$ 735	$ 676	$ 815	$ 45,308
Livestock Inventory Change	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Domestic Consumption	140	368	363	405	808	735	676	815	45,308
TOTAL RECEIPTS*	$ 886	$ 5,853	$ 9,219	$14,388	$27,119	$34,441	$55,577	$ 92,890	$2,513,162
COSTS OF OPERATION*									
Feed	$ 79	$ 393	$ 1,075	$ 1,794	$ 2,824	$ 2,932	$ 4,735	$ 7,490	$ 217,505
Lease/Grazing Fees:	$ 142	$ 905	$ 1,346	$ 1,917	$ 4,098	$ 3,604	$ 5,058	$ 9,806	$ 275,966
BLM (AUMs)	98	436	735	1,178	1,539	1,496	2,415	3,614	117,914
State (Acres)	44	469	429	542	1,796	1,545	1,780	3,953	109,054
Private (Acres)	-0-	-0-	182	197	763	563	863	2,239	48,998
Livestock Expenses:	$ 29	$ 97	$ 593	$ 866	$ 1,328	$ 2,171	$ 3,694	$ 7,215	$ 169,465
Veterinary/Medicine	29	97	172	248	360	565	913	1,728	43,944
Bulls	-0-	-0-	421	618	968	1,606	2,781	5,487	125,521
Labor (Hired)	$ 21	$ 199	409	$ 894	1,485	$ 2,776	$ 4,482	$ 7,069	$ 183,549
Other Expenses:	$ 90	$ 419	$ 955	$ 1,630	$ 2,901	$ 2,632	$ 4,017	$ 6,323	$ 191,775
Miscellaneous	76	318	820	1,482	2,369	2,074	3,349	4,865	154,048
Property Tax (land)	12	95	123	126	500	501	577	1,327	33,997
Property Tax (cattle)	2	6	12	22	32	57	91	131	3,730
Machinery/Equipment	$ 426	$ 1,673	$ 2,180	$ 2,523	$ 4,342	$ 2,822	$ 4,221	$ 6,585	$ 252,149
Developments	$ 59	$ 513	$ 1,512	$ 490	$ 1,714	$ 1,100	$ 1,266	$ 6,081	$ 133,030
TOTAL COST*	$ 846	$ 4,199	$ 8,070	$10,114	$18,692	$18,037	$27,473	$50,569	$1,423,439
NET RETURNS TO OPERATOR LABOR, MANAGEMENT AND CAPITAL	$ 40	$ 1,654	$ 1,149	$ 4,274	$ 8,427	$16,404	$28,104	$42,321	$1,089,723

*Denotes 1975 Dollars
**Denotes Average Ranch Size
Note: Ranch Sizes: Subsistence Small (1-29 AUs); Subsistence Large (30-69 AUs); Small Commercial Small (70-110 AUs); Small Commercial Medium (111-150 AUs); Small Commercial Large (151-199 AUs); Medium Commercial Small (200-309 AUs); Medium Commercial Large (310-499 AUs); Large (500+ AUs)

Source: BLM Socorro District Grazing Files and Southwest Research and Development Co., 1977

TABLE A-35

ESTIMATED RECEIPTS, COSTS, AND NET RETURNS PER RANCH SIZE CATEGORY
FOR PASTURE CAPACITY LEVEL ALTERNATIVE IN THE LONG TERM

	Subsistence Small (20 AUs)**	Subsistence Large (49 AUs)**	Small Commercial Small (84 AUs)**	Small Commercial Medium (129 AUs)**	Small Commercial Large (169 AUs)**	Medium Commercial Small (226 AUs)**	Medium Commercial Large (420 AUs)**	Large (688 AUs)**	Total ES Area
Number of Operators	22	18	8	6	5	16	8	15	98
Livestock Adjustments From Existing Environment	-20%	-20%	+20%	+10%	-40%	+20%	+20%	+30%	
CASH RECEIPTS*	$ 990	$3,977	$8,690	$14,825	$18,955	$28,553	$54,220	$91,726	$2,613,109
Cows	473	1,685	2,022	2,361	3,544	7,316	12,085	17,042	558,164
Yearling Heifers (1-2 Years)	-0-	-0-	787	-0-	701	958	907	1,135	49,410
Yearling Steers (1-2 Years)	-0-	-0-	-0-	-0-	913	1,356	2,071	1,858	70,699
Heifer Calves	234	837	1,603	4,467	4,945	6,052	13,595	25,539	673,242
Steer Calves	283	1,455	3,880	7,162	8,051	12,091	23,932	41,996	1,161,535
Bulls	-0-	-0-	398	835	801	780	1,630	4,156	100,059
Horses	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
NON-CASH RECEIPTS*	$ 283	$ 285	$ 354	$ 359	$ 563	$ 513	$ 685	$ 798	$ 44,815
Livestock Inventory Change	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Domestic Consumption	283	285	354	359	563	513	685	798	44,815
TOTAL RECEIPTS*	$1,273	$4,262	$9,044	$15,184	$19,518	$29,066	$54,905	$92,524	$2,657,924
COST OF OPERATION*									
Feed	$ 105	$ 377	$1,050	$ 1,867	$ 2,652	$ 2,712	$ 4,792	$ 7,458	$ 235,556
Lease/Grazing Fees:	$ 216	$ 748	$1,315	$ 2,345	$ 3,849	$ 3,216	$ 5,569	$ 7,870	$ 276,109
BLM (AUMs)	131	418	718	1,226	1,445	1,541	2,444	3,598	128,909
State (Acres)	85	330	455	820	1,687	1,128	2,104	2,724	100,257
Private (Acres)	-0-	-0-	178	299	717	547	1,021	1,548	46,943
Livestock Expenses:	$ 38	$ 93	$ 580	$ 1,193	$ 1,247	$ 1,699	$ 3,658	$ 6,763	$ 178,436
Veterinary/Medicine	38	93	168	258	338	497	924	1,720	48,236
Bulls	-0-	-0-	412	935	909	1,202	2,734	5,043	130,200
Labor (Hired)	$ 28	$ 191	$ 399	$ 930	$ 1,394	$ 2,242	$ 4,536	$ 7,038	$ 197,526
Other Expenses:	$ 128	$ 379	$ 933	$ 1,756	$ 2,724	$ 2,407	$ 4,166	$ 5,890	$ 201,448
Miscellaneous	101	306	801	1,542	2,224	2,034	3,389	4,844	166,826
Property Tax (Land)	25	67	120	191	470	328	685	915	30,665
Property Tax (Cattle)	2	6	12	23	30	45	92	131	3,957
Machinery/Equipment	$ 636	$1,447	$2,129	$ 2,841	$ 4,076	$ 2,647	$ 4,414	$ 5,986	$ 261,950
Developments	$ 122	$ 361	$1,477	$ 742	$ 1,609	$ 861	$ 1,499	$ 4,197	$ 122,218
TOTAL COST*	$1,273	$3,596	$1,883	$11,674	$17,551	$15,784	$28,634	$45,202	$1,473,243
NET RETURNS TO OPERATOR LABOR, MANAGEMENT, AND CAPITAL	$ -0-	-$ 666	$1,161	$ 3,510	$ 1,967	$13,282	$26,271	$47,322	$1,184,681

*Denotes 1975 Dollars
**Denotes Average Ranch Size
Note: Ranch Sizes: Subsistence Small (1-29 AUs); Subsistence Large (30-69 AUs); Small Commercial Small (70-110 AUs); Small Commercial Medium (111-150 AUs); Small Commercial Large (151-199 AUs); Medium Commercial Small (200-309 AUs); Medium Commercial Large (310-499 AUs); Large (500+ AUs)

Source: BLM Socorro District Grazing Files and Southwest Research and Development Co., 1977

TABLE A-36

ESTIMATED RECEIPTS, COSTS, AND NET RETURNS PER RANCH SIZE CATEGORY
FOR ENHANCEMENT OF SENSITIVE RESOURCE VALUES ALTERNATIVE IN THE LONG TERM

	Subsistence Small (13 AUs)**	Subsistence Large (50 AUs)**	Small Commercial Small (93 AUs)**	Small Commercial Medium (135 AUs)**	Small Commercial Large (170 AUs)**	Medium Commercial Small (263 AUs)**	Medium Commercial Large (406 AUs)**	Large (851 AUs)**	Total ES Area
Number of Operators	20	20	8	6	5	14	10	15	98
Livestock Adjustments From Existing Environment	-30%	-20%	+20%	+20%	-40%	+10%	+50%	+30%	
CASH RECEIPTS*	$702	$4,075	$9,869	$15,681	$19,362	$33,904	$53,669	$92,090	$2,758,084
Cows	470	1,731	2,285	2,651	3,565	8,737	11,770	17,234	594,559
Yearling Heifers (1-2 Years)	-0-	-0-	798	-0-	801	963	719	1,135	48,086
Yearling Steers (1-2 Years)	-0-	-0-	-0-	-0-	957	1,638	1,670	2,030	74,367
Heifer Calves	232	860	1,855	4,741	5,090	7,335	13,199	25,539	708,341
Steer Calves	-0-	1,484	4,490	7,474	8,070	13,984	23,909	41,996	1,215,600
Bulls	-0-	-0-	441	815	879	1,247	2,452	4,156	117,131
Horses	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
NON-CASH RECEIPTS*	$172	$ 380	$ 392	$ 375	$ 388	$ 552	$ 662	$ 682	$ 42,944
Livestock Inventory Change	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Domestic Consumption	172	380	392	375	388	552	662	682	42,944
TOTAL RECEIPTS*	$874	$4,455	$10,261	$16,056	$19,750	$34,456	$54,331	$92,772	$2,801,028
COST OF OPERATION*									
Feed	$ 68	$ 385	$ 1,163	$ 1,953	$ 2,667	$ 3,156	$ 4,632	$ 7,458	$ 245,791
Lease/Grazing Fees:	$147	$ 765	$ 913	$ 2,361	$ 3,872	$ 3,924	$ 4,779	$ 7,870	$ 279,846
BLM (AUMs)	85	427	195	1,283	1,454	1,796	2,363	3,598	129,512
State (Acres)	62	338	504	790	1,697	1,433	1,628	2,724	102,459
Private (Acres)	-0-	-0-	214	288	721	695	788	1,548	47,875
Livestock Expenses:	$ 25	$ 95	$ 681	$ 1,170	$ 1,255	$ 2,106	$ 3,853	$ 6,763	$ 190,602
Veterinary/Medicine	25	95	186	270	340	578	893	1,720	50,030
Bulls	-0-	-0-	495	900	915	1,528	2,960	5,043	140,572
Labor (Hired)	$ 18	$ 195	$ 442	$ 973	$ 1,403	$ 2,609	$ 4,385	$ 7,038	$ 206,595
Other Expenses:	$ 85	$ 386	$ 1,043	$ 1,821	$ 2,741	$ 2,838	$ 3,893	$ 5,890	$ 209,407
Miscellaneous	66	312	886	1,613	2,237	2,367	3,276	4,844	174,069
Property Tax (Land)	18	68	144	184	473	419	528	915	31,212
Property Tax (Cattle)	1	6	13	24	31	52	89	131	4,126
Machinery/Equipment	$429	$1,476	$ 2,402	$ 2,915	$ 4,100	$ 3,142	$ 4,072	$ 5,986	$ 269,818
Developments	$ 89	$ 368	$ 1,774	$ 714	$ 1,618	$ 1,097	$ 1,157	$ 4,197	$ 125,589
TOTAL COST*	$861	$3,670	$ 8,418	$11,907	$17,656	$18,873	$26,771	$45,202	$1,527,648
NET RETURNS TO OPERATOR, LABOR, MANAGEMENT, AND, CAPITAL	$ 13	$ 785	$ 1,843	$ 4,149	$ 2,094	$15,583	$27,560	$47,570	$1,273,380

*Denotes 1975 Dollars
**Denotes Average Ranch Size
Note: Ranch Sizes: Subsistence Small (1-29 AUs); Subsistence Large (30-69 AUs); Small Commercial Small (70-110 AUs); Small Commercial Medium (111-150 AUs); Small Commercial Large (151-199 AUs); Medium Commercial Small (200-309 AUs); Medium Commercial Large (310-499 AUs); Large (500+ AUs)

Source: BLM Socorro District Grazing Files and Southwest Research and Development Co., 1977

TABLE A-37

ESTIMATED RECEIPTS, COSTS, AND NET RETURNS PER RANCH SIZE CATEGORY
FOR NO GRAZING ALTERNATIVE IN THE LONG TERM

	Subsistence Small (10 AUs)**	Subsistence Large (46 AUs)**	Small Commercial Small (89 AUs)**	Small Commercial Medium (129 AUs)**	Small Commercial Large (193 AUs)**	Medium Commercial Small (249 AUs)**	Medium Commercial Large (415 AUs)**	Large (671 AUs)**	Total ES Area
Number of Operators	38	18	7	2	2	6	9	5	87
Livestock Adjustments From Existing Environment	+10%	-30%	0	-60%	-70%	-60%	+30%	-70%	
CASH RECEIPTS*	$ 637	$3,128	$9,241	$14,534	$21,852	$30,374	$55,212	$87,083	$1,332,536
Cows	237	1,213	2,007	2,121	4,420	8,163	12,077	16,809	299,687
Yearling Heifers (1-2 Years)	-0-	-0-	781	592	795	965	979	832	27,002
Yearling Steers (1-2 Years)	-0-	-0-	-0-	-0-	1,857	1,150	1,872	1,651	35,717
Heifer Calves	117	604	1,853	4,198	5,620	6,601	13,612	25,102	335,549
Steer Calves	283	1,311	4,178	6,343	7,413	12,208	24,091	38,059	571,472
Bulls	-0-	-0-	422	1,280	1,747	1,287	2,581	4,630	63,109
Horses	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
NON-CASH RECEIPTS*	$ 141	$ 385	$ 376	$ 410	$ 384	$ 561	$ 813	$ 560	$ 29,991
Livestock Inventory Change	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Domestic Consumption	141	385	376	410	384	561	813	560	29,991
TOTAL RECEIPTS*	$ 778	$3,513	$9,617	$14,944	$22,236	$30,935	$56,025	$87,643	$1,362,527
COST of OPERATION*									
Feed	$ 53	$ 354	$1,113	$1,867	$ 3,028	$ 2,988	$ 4,735	$ 7,274	$ 122,880
Lease/Grazing Fees:	$ 97	$ 751	$1,521	$4,317	$ 7,081	$ 7,226	$ 5,262	$21,559	$ 249,156
BLM (AUMs)	65	393	761	1,226	1,650	1,698	2,415	3,509	70,091
State (Acres)	32	358	533	2,265	3,812	3,725	1,917	11,521	120,753
Private (Acres)	-0-	-0-	227	826	1,619	1,803	930	6,529	58,312
Livestock Expenses:	$ 19	$ 87	$ 701	$1,548	$ 2,440	$ 1,873	$ 3,905	$ 7,006	$ 96,584
Veterinary/Medicine	19	87	178	258	386	548	913	1,678	24,717
Bulls	-0-	-0-	523	1,290	2,054	1,325	2,992	5,328	71,867
Labor (Hired)	$ 14	$ 179	$ 423	$ 930	$ 1,592	$ 2,470	$ 4,482	$ 6,864	$ 101,237
Other Expenses:	$ 61	$ 366	$1,013	$2,093	$ 3,637	$ 3,377	$ 4,038	$ 8,723	$ 127,676
Miscellaneous	51	287	848	1,542	2,540	2,241	3,349	4,724	88,411
Property Tax (Land)	9	73	153	528	1,062	1,086	598	3,872	37,165
Property Tax (Cattle)	1	6	12	23	35	50	91	127	2,100
Machinery/Equipment	$ 294	$1,422	$2,358	$4,049	$ 6,336	$ 4,231	$ 4,250	$ 9,984	$ 187,600
Developments	$ 46	$ 391	$1,877	$2,049	$ 3,634	$ 2,852	$ 1,316	$17,714	$ 150,817
TOTAL COST*	$ 584	$3,550	$9,006	$16,853	$27,748	$25,017	$27,988	$79,124	$1,035,950
NET RETURNS TO OPERATOR LABOR, MANAGEMENT AND CAPITAL	$ 194	-$ 37	$ 611	-$1,909	-$5,512	$ 5,918	$28,037	$ 8,519	$ 326,577

*Denotes 1975 Dollars
**Denotes Average Ranch Size
Note: Ranch Sizes: Subsistence Small (1-29 AUs); Subsistence Large (30-69 AUs); Small Commercial Small (70-110 AUs); Small Commercial Medium (111-150 AUs); Small Commercial Large (151-199 AUs); Medium Commercial Small (200-309 AUs); Medium Commercial Large (310-499 AUs); Large (500+ AUs)

Source: BLM Socorro District Grazing Files and Southwest Research and Development Co., 1977

APPENDIX 7

RECREATION

METHODOLOGY FOR DETERMINATION OF ESTIMATED RECREATION USE

Recreation use for the ES Area was estimated primarily from the 1976 New Mexico State Comprehensive Outdoor Recreation Plan (SCORP). From 35 outdoor recreation activities listed, ten were selected as being of significant relevance to public lands in the ES Area. Those selected were:

Photography/Painting	Hiking
Birdwatching	Trailbiking/4-Wheeling
Sight-seeing	Sport Shooting
Picknicking	Big Game Hunting
Camping	Small Game Hunting

The existing and projected recreation use figures (Table A-38, p. 105) were calculated from populations of Planning District 7 (Sierra, Dona Ana, and Socorro Counties). This planning unit was selected as having population characteristics most representative of the ES Area. A sample survey of 2,600 was made. It projected recreation demand in the planning districts, based on population characteristics. The survey determined recreation use estimates for Planning District 7 having a total population of 95,000.

The population of Socorro County is 9,300 (NM SCORP, 1976), 9.78 percent of Planning District 7's population of 95,000. Ten selected activities for the Stallion Planning Unit were calculated, using 9.7 percent of Planning District 7's demand figures.

It was determined that the total population of 8,989 of adjacent communities had a significant effect on the recreation use in the Ladron Planning Unit. The Planning Unit is split between Planning Districts 7 and 3. It was felt that the rural characteristics of the population in and adjacent to the planning unit were more reflective of Planning District 7 than of 3, which has the urban population of Albuquerque. The Ladron Planning Unit's population is 9.46 percent of District 7's population. Therefore, data from Planning District 7 was extrapolated, using 9.46 percent of the active demand figures.

The recreation use figures, calculated above, were then subjected an interdisciplinary review by BLM resource specialists. This review resulted in an adjustment to the use figures based on the specialist's expertise and field observations.

The New Mexico SCORP projected an average 43-percent increase between existing use and that occurring in 1990. This rate of increase was used in the calculations for projected use in the long term.

Table A-38, p. 105, illustrates the total extrapolation process.

TABLE A-38

METHOOOLOGY FOR OETERMINATION OF ESTIMATEO RECREATION USE (LONG TERM)

SELECTED RECREATION ACTIVITIES	LAORON PLANNING UNIT Existing	LAORON PLANNING UNIT Projected	STALLION PLANNING UNIT Existing	STALLION PLANNING UNIT Projected	ES AREA (TOTAL OF P.U.) Existing	ES AREA (TOTAL OF P.U.) Projected	% of Adjustment	ES AREA (FINAL AOJUSTEO) Existing	ES AREA (FINAL AOJUSTEO) Projected
Photography/Painting	7,414	10,602	7,665	10,961	15,079	21,562	10	1,508	2,156
Birdwatching	12,043	17,221	12,450	17,804	24,493	35,025	10	2,449	3,503
Sight-seeing	12,043	17,221	12,450	17,804	24,493	35,025	20	4,899	7,006
Picnicking	16,806	24,033	17,374	24,845	34,180	48,878	2	683	977
Camping	4,844	6,927	7,889	11,281	12,733	18,208	2	255	364
Hiking	7,324	10,474	7,572	10,828	14,896	21,302	15	2,234	3,195
Trailbiking/4-Wheeling	11,144	15,936	11,520	16,474	22,664	32,410	1	227	324
Sport/Shooting	2,400	3,431	2,480	3,546	4,880	6,978	70	3,416	4,885
Big Game Hunting	3,424	4,896	3,540	5,062	6,964	9,959	85	5,919	8,465
Small Game Hunting	10,065	14,394	10,406	14,880	20,471	29,274	65	13,306	19,028
	9.46% of SCORP Planning Oistrict 7 Oemand 1/	43 % Increase	9.78 % of SCORP Planning Oistrict 7 Oemand	43 % Increase					

1/ Oemand - The term "Demand" is used as a measurement of participation levels, 1976 N. M. SCORP

Source: BLM Socorro Oistrict Files, SCORP, 1976.

APPENDIX 8

VISUAL RESOURCES

METHODOLOGY FOR DETERMINING VISUAL RESOURCE MANAGEMENT (VRM) CLASSES

VRM classes are determined by a combination of three factors:

Scenic quality | Visual sensitivity levels | Distance zones

Scenic quality is derived from assigning a scenery class to physiographic areas based on several criteria (Figure A-17). Three quality ratings result from this process:

A - Outstanding | B - Above average | C - Average

Visual sensitivity levels are an index of the relative importance of visual resources to an area. The resultant sensitivity levels are categorized as:

High | Medium | Low

Commonly considered criteria are:

1. Traffic counts for highways, roads, and trails;
2. Traditional land use - Resource Associations of local, regional and national significance;
3. Community attitudes;
4. Existing and proposed land uses; and
5. Other agency uses and attitudes.

Distance zones are determined by the distance from which the resource is being viewed. These are usually mapped from the major routes of travel in the resource area. Distance zones are delineated and labeled according to the following criteria:

Foreground - Middleground: From 0 to 5 miles.

Background - From 3 to 15 miles.

Seldom seen - Beyond 15 miles. Areas which are screened or hidden from the normal viewing points.

After the three factors of visual sensitivity, visual zones, and scenic quality for the physiographic areas have been determined, they are inserted into the VRM Matrix (Figure A-18) which decides the final VRM class.

Scenery Quality Inventory Chart

KEY FACTORS	RATING CRITERIA AND SCORE		
(1) LAND FORM	Vertical or near vertical cliffs, spires, highly eroded formations, massive rock outcrops, severe surface variation. 4	Steep canyon walls, mesas, interesting erosional patterns, variety in size & shape of land forms. 2	Rolling hills, foothills, flat valley bottoms. 1
(2) COLOR	Rich color combinations variety or vivid contrasts in the color of soil, rocks, vegetation or water. 4	Some variety in colors and contrast of the soil, rocks & vegetation, but not dominant. 2	Subtle color variations, little contrast, generally muted tones. Nothing really eye-catching. 1
(3) WATER	Still, chance for reflections or cascading white water, a dominant factor in the landscape. 4	Moving and in view or still but not dominant. 2	Absent, or present but seldom seen. 1
(4) VEGETATION	A harmonious variation in form, texture, pattern, and type. 4	Some variation in pattern and texture, but only one or two major types. 2	Little or no variation, contrast lacking. 1
(5) UNIQUENESS	One of a kind or very rare within region. 6	Unusual but similar to others within the region. 2	Interesting in its setting, but fairly common within the region. 1
(6) INTRUSIONS	Free from aesthetically undesirable or discordant sights and influences. 2	Scenic quality is somewhat depreciated by inharmonous intrusions but not so extensive that the scenic qualities are entirely negated. 1	Intrusions are so extensive that scenic qualities are for the most part nullified. -4

Scenery A = 15-24

Scenery B = 10-14

Scenery C = 1-9

EXPLANATION OF RATING CRITERIA

(1) Land Form or topography becomes more interesting as it gets steeper and more massive. Examples of outstanding land forms are found in the Grand Canyon, the Sawtooth Mountain Range in Idaho, the Wrangle Mountain Range in Alaska, and the Rocky Mountain National Park.

(2) Color. Consider the overall color of the basic components of the landscape (i.e., soil, rocks, vegetation, etc.) as they appear during the high-use season. Key factors to consider in rating "color" are variety, contrast, and harmony.

(3) Water is the ingredient which adds movement or serenity to a scene. The degree to which water dominates the scene is the primary consideration in selecting the rating score.

(4) Vegetation. Give primary consideration to the variety of patterns, forms, and texture created by the vegetation.

(5) Uniqueness. This factor provides an opportunity to give added importance to one or all of the scenic features that appear to be relatively unique within any one physiographic region. There may also be cases where a separate evaluation of each of the key factors does not give a true picture of the overall scenic quality of an area. Often it is a number of not so spectacular elements in the proper combination that produces the most pleasing scenery - the uniqueness factor can be used to recognize this type of area and give it the added emphasis it needs.

(6) Intrusions. Consider the impact of man-made improvements on the aesthetic quality. These intrusions can have a positive or negative aesthetic impact. Rate accordingly.

INSTRUCTIONS (See .1 for general procedures.)

Purpose: To rate the aesthetic quality of the scenic resource on all BLM lands.

How to Identify Scenery Value: All Bureau lands have scenic value.

How to Determine Minimum Suitability: All BLM lands are rated for scenic values. Also rate adjacent or intermingling non-BLM lands.

How to Delineate Rating Areas: Consider the following factors when delineating rating areas:

1. Like physiographic characteristics (i.e., land form, vegetation, etc.)
2. Similar visual patterns, texture, color, variety, etc.
3. Areas which have a similar impact from intrusions (i.e., roads, structures, mining operations, or other surface disturbances).

Source: BLM Manual 6310

Figure A-17. Scenery Quality Inventory Chart

		VISUAL SENSITIVITY LEVEL 2/						
		HIGH			MEDIUM			LOW
SPECIAL AREAS		I	I	I	I	I	I	I
SCENERY CLASS 1/	A	II	II	II	II	II	II	II
	B	II	III	IV	III	IV	IV	IV
	C	III	IV	IV	IV	IV	IV	IV
		FG	BG	SS	FG	BG	SS	SS
		VISUAL ZONES 3/						

1/ SCENERY QUALITY INVENTORY A, B, C

2/ VISUAL SENSITIVITY LEVEL High
Medium
Low

3/ VISUAL ZONES FG - Foreground-Middleground
BG - Background
SS - Seldom Seen

Note: Class I applies only to classified special areas, e.g., wilderness, primitive, natural areas, etc. The quality standard is established through legislation or policy.

Source: BLM Visual Resource Mannual 8410

Figure A-18. Visual Resource Class Determination Matrix

VISUAL RESOURCE CONTRAST RATINGS OF TYPICAL RANGE DEVELOPMENTS

A contrast rating was made for each project category evaluating the degree of change in form, line, color, and texture of the major features (Table A-39 p. 110). The basic elements have been weighted as follows to indicate their relative importance in detecting changes in contrast: form (4), line (3), color (2), and texture (1). By assigning values that indicate degree of contrast, 3 for strong, 2 for moderate, 1 for weak and 0 for none, a direct multiplier for an indication of the strength of the contrast can be set up. For example, if the construction of a water storage tank would create a strong change in form of the area, the following calculation would indicate the strength of the contrast, i.e., [form (4)1 x [strong (3)] = 12. In this example, the degree of contrast for change in form is 12. This would be added to the degree of contrast for the other three basic elements for the total contrast rating. Standards for meeting VRM classes are as follows:

Class I - The degree of contrast for any one element may not exceed 1 (weak) and the total contrast rating for any feature must be less than 10.

Class II - The degree of contrast for any one element should not exceed 2 (moderate) and the total contrast rating for any feature may not exceed 10.

Class III - The degree of contrast for any one element should not exceed 2 (moderate) and the total contrast for any one feature may not exceed 16.

Class IV - The total contrast rating for any feature should not exceed 20.

A total score for each feature of 1 to 10 indicates the contrast can be seen, but does not attract attention; 11 to 20 attracts attention and the contrast begins to dominate the characteristic landscape; 21 to 30 demands attention and will not be overlooked.

TABLE A-39

VISUAL RESOURCE CONTRAST RATINGS OF TYPICAL RANGE DEVELOPMENTS

Proposed Project	Feature	Element		Contrast		Score
Pipelines	Vegetation (Short term)	Form (4)	x	Weak (1)	=	4
		Line (3)	x	Strong (3)	=	9
		Color (2)	x	Weak (1)	=	2
		Texture (1)	x	Weak (1)	=	1
						16
	Total score 16 (max. for 30) indicated moderate contrast.					
	Vegetation (Long term)	Form (4)	x	None -	=	0
		Line (3)	x	Strong (3)	=	9
		Color (2)	x	Weak (2)	=	4
		Texture (1)	x	Weak (1)	=	1
						14
	Score of 14 (max. of 30) indicates weak contrast.					
Earthen Reservoir	Land surface and vegetation (Short and long term)	Form (4)	x	Mod. (2)	=	8
		Line (3)	x	Mod. (2)	=	6
		Color (2)	x	Strong (3)	=	6
		Texture (1)	x	Mod. (2)	=	2
						22
	Land surface and vegetation total score of 22 (max. of 30) indicates moderate contrast.					
Wildlife Waters	Land surface and vegetation (Short term)	Form (4)	x	Weak (1)	=	4
		Line (3)	x	Weak (1)	=	3
		Color (2)	x	Weak (1)	=	2
		Texture (1)	x	Mod. (2)	=	2
						11
	Land surface and vegetation score of 11 (max. 30) indicate weak contrast.					
	Land surface and vegetation (Long term)	Form (4)	x	Weak (1)	=	4
		Line (3)	x	Weak (1)	=	3
		Color (2)	x	Weak (1)	=	2
		Texture (1)	x	Mod. (2)	=	2
						11
	Land surface and vegetation score of 11 (max. 30) indicates weak contrast.					
	Structures (Short term)	Forms (4)	x	Mod. (2)	=	8
		Line (3)	x	Weak (1)	=	3
		Color (2)	x	Weak (1)	=	2
		Texture (1)	x	Mod. (2)	=	2
						15
	Total score of 15 (max. 30) indicates weak to moderate contrast.					
	Structures (Long term)	Form (4)	x	Weak (1)	=	4
		Line (3)	x	Weak (1)	=	3
		Color (2)	x	Weak (1)	=	2
		Texture (1)	x	Mod. (2)	=	2
						11
	Total score of 11 (max. 30) indicates weak contrast.					
Maintenance Roads	Land form and vegetation (Short term)	Form (4)	x	Mod. (2)	=	8
		Line (3)	x	Strong (3)	=	9
		Color (2)	x	Strong (3)	=	6
		Texture (1)	x	Weak (1)	=	1
						24
	Land form and vegetation score of 24 (max. 30) indicates strong contrast.					
Maintenance Roads	Land form and vegetation (Long term)	Form (4)	x	Mod. (2)	=	8
		Line (3)	x	Mod. (2)	=	6
		Color (2)	x	Mod. (2)	=	4
		Texture (1)	x	Weak (1)	=	1
						19
	Land form and vegetation score of 19 (max. 30) indicates moderate contrast.					
Temporary Roads	Vegetation (Short term)	Form (4)	x	Mod. (2)	=	8
		Line (3)	x	Strong (3)	=	9
		Color (2)	x	Mod. (2)	=	4
		Texture (1)	x	Mod. (2)	=	2
						23
	Total score of 23 (max. 30) indicates strong contrast.					
	Vegetation (Long term)	Form (4)	x	Weak (1)	=	4
		Line (3)	x	Mod. (2)	=	6
		Color (2)	x	Weak (1)	=	2
		Texture (1)	x	None (0)	=	0
						12
	Total score of 12 (max. 30) indicates weak contrast.					

TABLE A-39 (continued)

VISUAL RESOURCE CONTRAST RATINGS OF TYPICAL RANGE DEVELOPMENTS

Proposed Project	Feature	Element		Contrast		Score
Fences	Structure (Short term)	Form (4)	x	Weak (1)	=	4
		Line (2)	x	Mod. (3)	=	6
		Color (2)	x	Mod. (2)	=	4
		Texture (1)	x	Weak (1)	=	1
						15
	Total score of 15 (max. 30) indicates moderate contrast.					
	Structure (Long term)	Form (4)	x	Weak (1)	=	4
		Line (3)	x	Mod. (2)	=	6
		Color (2)	x	Weak (1)	=	2
		Texture (1)	x	Weak (1)	=	1
						13
	Total score of 13 (max. 30) indicates weak contrast.					
Sacrifice Areas	Vegetation (Short term)	Form (4)	x	Weak (1)	=	4
		Line (3)	x	Strong (3)	=	9
		Color (2)	x	Strong (3)	=	6
		Texture (1)	x	Mod. (2)	=	2
						21
	Total score of 21 (max. 30) indicates strong contrast.					
	Vegetation (Long term)	Form (4)	x	Weak (1)	=	4
		Line (3)	x	Mod. (2)	=	6
		Color (2)	x	Strong (3)	=	6
		Texture (1)	x	Weak (1)	=	1
						17
	Total score of 17 (max. 30) indicates moderate contrast.					
Wells	Structure (Short term)	Form (4)	x	Mod. (2)	=	8
		Line (3)	x	Weak (1)	=	3
		Color (2)	x	Weak (1)	=	2
		Texture (1)	x	Mod. (2)	=	2
						15
	Total score of 15 (max. 30) indicates weak to moderate contrast.					
	Structure (Long term)	Form (4)	x	Weak (1)	=	4
		Line (3)	x	Weak (1)	=	3
		Color (2)	x	Weak (1)	=	2
		Texture (1)	x	Mod. (2)	=	2
						11
	Total score of 11 (max. 30) indicates weak contrast.					
Springs	Structure (Short term)	Form (4)	x	Mod. (2)	=	8
		Line (3)	x	Weak (1)	=	3
		Color (2)	x	Weak (1)	=	2
		Texture (1)	x	Mod. (2)	=	2
						15
	Total score of 15 (max. 30) indicates weak to moderate contrast.					
	Structure (Long term)	Form (4)	x	Weak (1)	=	4
		Line (3)	x	Weak (1)	=	3
		Color (2)	x	Weak (1)	=	2
		Texture (1)	x	Mod. (2)	=	2
						11
	Total score of 11 (max. 30) indicates weak contrast.					
Storage Tanks	Vegetation (Short term)	Form (4)	x	Weak (1)	=	4
		Line (3)	x	Strong (3)	=	9
		Color (2)	x	Weak (1)	=	2
		Texture (1)	x	Weak (1)	=	1
						16
	Total score of 16 (max. 30) indicates moderate contrast.					
	Vegetation (Long term)	Form (4)	x	Weak (1)	=	4
		Line (3)	x	None (0)	=	0
		Color (2)	x	Mod. (2)	=	4
		Texture (1)	x	Weak (1)	=	1
						9
	Total score of 9 (max. 30) indicates low contrast.					
Troughs	Structures (Short term)	Form (4)	x	Mod. (2)	=	8
		Line (3)	x	Weak (1)	=	3
		Color (2)	x	Weak (1)	=	2
		Texture (1)	x	Mod. (2)	=	2
						15
	Total score of 15 (max. 30) indicates moderate contrast.					

TABLE A-39 (continued)

VISUAL RESOURCE CONTRAST RATINGS OF TYPICAL RANGE DEVELOPMENTS

Proposed Project	Feature	Element		Contrast		Score
Troughs (continued)	Structures (Long term)	Form (4)	x	Mod. (2)	=	8
		Line (3)	x	Weak (1)	=	3
		Color (2)	x	Weak (1)	=	2
		Texture (1)	x	Mod. (2)	=	2
						15
	Total score of 15 (max. 30) indicates weak to moderate contrast.					
Cattleguards	Structures (Short term)	Form (4)	x	Mod. (2)	=	8
		Line (3)	x	Weak (1)	=	3
		Color (2)	x	Weak (1)	=	2
		Texture (1)	x	Mod. (2)	=	2
						15
	Total score of 15 (max. 30) indicates weak to moderate contrast.					
	Structures (Long term)	Form (4)	x	Mod. (2)	=	8
		Line (3)	x	Weak (1)	=	3
		Color (2)	x	Weak (1)	=	2
		Texture (1)	x	Mod. (2)	=	2
						15
	Total score of 15 (max. 30) indicates weak to moderate contrast.					

Source: BLM Socorro District Files

TABLE A-40

ACRES PER VISUAL RESOURCE MANAGEMENT CLASS (BY ALLOTMENT)

	Class I	Class II	Class III	Class IV	Class V
AMPs /1					
002 Mesa Carrizo		2,000		46,523	
006 Ojo Saladito		400	12,696	635	
012 Riley Community			2,729		
016 Puertecito & Barranco			22,957	2,880	
036 Rio Puerco			6,048	6,048	
037 Chavez Community	2,080		11,996		
052 Cerro Colorado				2,096	
058 Canon Alamito			4,577		
059 La Jencia	1,240		26,450		
065 Arroyo Lucero		640	9,833	22,619	
077 Ladron Peak	1,840		4,733		
081 Lopez Community			5,789		400
083 Big Sandy Wash				634	
086 West Ladron	4,600		23,282		
089 Tsidu-Weza				644	
090 Petoch Wash				13,899	
091 Canada Colorado			7,474		
114 Cerro de Oro			23,000	23,573	
121 Rio Salado West			9,708		
122 Abeytas				2,217	3,200
129 Arroyo Colorado		1,520		70,825	
131 Los Valles				10,940	
152 Cerro Verde		180	1,280	30,618	
250 Milligan Gulch			12,525	5,445	
251 Harless				17,196	
252 Fernandez-Maestas				21,285	
253 Vigil Individual				3,117	
254 Bordo Atravesado				25,163	
255 Bosquecito				6,127	
256 Llano				15,787	
258 Ojo de Amado			80	12,791	
260 Sierra Larga				18,395	
261 Sheep Canyon			16,919	13,199	
262 Las Canas			960	22,439	
263 Black Mesa			8,900	12,700	
264 Armijo Community			3,400	7,240	
266 Coyote Spring				13,517	
268 Torreon			13,756	22,139	

TABLE A-40 (continued)

ACRES PER VISUAL RESOURCE MANAGEMENT CLASS (BY ALLOTMENT)

	Class I	Class II	Class III	Class IV	Class V
AMPs (continued)					
271 Mesa Redonda				20,155	
272 San Pasqual - River				22,622	
275 Adobe, Hasenburg, Padilla				73,224	
276 C. A. Bar				3,040	
277 San Jose Canyon		1,624	21,228	3,840	
279 Silver Canyon			10,623	10,535	
280 Tecolote Draw				18,029	
283 Blackington Mountain			2,560	20,300	
284 Mesa Canyon Well				11,662	
285 Sand Mountain				27,875	
287 Gabaldon Individual				5,114	
288 Rio Grande				5,302	
289 Jornada Community				10,670	
290 Rock Springs Canyon			390	12,336	
291 Prairie Spring				10,626	
293 Malpais			3,692	39,209	
294 Nogal			2,649	8,882	
295 Antelope Well				21,165	
297 Puertecito del Lemitar			18,667	1,329	
298 Belcher-Corn				7,516	
299 Pequeno			12,934		
300 Lucero Individual				3,499	
301 Bennett-Wilson				31,703	
303 Carthage				707	
306 Veranito				6,160	
308 Padilla Community			5,527		
312 La Arenosa			1,156	8,294	
315 Polvadera Community			1,967	2,361	
317 San Pedro			935	2,810	
318 Pueblito Community				5,328	
321 Puertecito Gap				11,573	
322 Parida				17,566	
323 Water Canyon			874	12,443	
325 West Williams				13,866	
327 Cedar Pass				11,813	
328 Canon Quemado				6,410	
330 East Williams				8,124	

TABLE A-40 (continued)

ACRES PER VISUAL RESOURCE MANAGEMENT CLASS (BY ALLOTMENT)

	Class I	Class II	Class III	Class IV	Class V
AMPs (continued)					
347 Blue Springs				584	
348 Cerro Montoso				2,358	
349 Indian Peak				1,315	
360 Chupadera				4,382	
TOTAL	9,760	6,364	312,294	935,418	3,600
ACRES PER VISUAL RESOURCE CLASS (Includes only Public Lands)					
Non-AMPs /2					
All 26 allotments 46,142 Total Acres			6,201	39,941	
Elimination of Grazing /2					
4 allotments 1,987 Total Acres		109	751	1,127	
Unallotted					
2 allotments 2,582 Total Acres			2,379	203	
GRAND TOTAL	9,760	6,773	321,625	976,689	3,600

/1 Acres per Visual Resource Management Class (by allotment) (Includes public, State, and private lands)
/2 Acres per Visual Resource Management Class (by allotment) (Includes only public lands)

Source: URA Visual Resource Classes Overlay and Allotment Maps, Socorro District

APPENDIX 9

WILDERNESS

TABLE A-41

58 ALLOTMENTS IN ROADLESS AREAS

Allot. Numbers	Allot. Names	Allot. Numbers	Allot. Names
016	Puertecito and Barranco	121	Rio Salado West
012	Riley Community	059	La Jencia
086	West Ladron	052	Cerro Colorado
077	Ladron Peak	037	Chavez Community
006	Ojo Saladito	058	Canon Alamito
091	Canada Colorado	081	Lopez Community
036	Rio Puerco	122	Abeytas
129	Arroyo Colorado	090	Petoch Wash
165	R. Lucero Ind.	258	Ojo de Amado
318	Pueblito Community	006	Veranito
322	Parida	315	Polvadera Community
297	Puertecito del Lemitar	323	Water Canyon
263	Black Mesa	299	Pequeno
308	Padilla Community	268	Torreon
281	Culbreath Ind.	261	Ball Ind.
321	Puertecito Gap	250	Milligan Gulch
261	Sheep Canyon	279	Silver Canyon
293	Malpais	272	San Pasqual
285	Sand Mountain	256	Llano
275	Adobe, Hansenburg, Padilla	301	Bennett-Wilson
325	West Williams	289	Jornada Community
291	Prairie Spring	266	Coyote Springs
300	Lucero Ind.	254	Bordo Atravesado
260	Sierra Larga	271	Mesa Redonda
358	Creel Ind.	280	Tecolote Draw
262	Las Canas	264	Armijo Community
283	Blackington Mountain	252	Fernandez-Maestas
312	La Arenosa	255	Bosquecito
288	Rio Grande	287	Gabaldon Ind.

Source: BLM Socorro District Files

APPENDIX 10

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Page

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY METHODOLOGY

The annual rates of production under the Proposed Action and alternatives for the 20-year short-term use period is not available.

Generalizations drawn from range management literature were reworked by BLM personnel to produce an idealized response curve which is simplified as shown in Figure A-19, p. A-118. The total 20-year production was calculated using the following equation derived from the simplified curve.

$$\text{Total Production} = 20g + (.5)(5)(.8h) + (10)(.8h) + (.5)(10)(.2h)$$

$$= 20g + 11h$$

Where g = existing or short-term annual production (years 1-5)

h = long-term annual production (year 20) - existing or short-term annual production (years 1-5)

The long-term productivity is the percentage change between the long-term (20 year) production under the Proposed Action and alternatives and that of the Future Environment (which is the same as the No Action Alternative).

Annual vegetative production is expected to continue increasing after 2000 for an undetermined period. This would also affect other resources. Because the additional increase has not been calculated in this ES, it will not be used when calculating the long-term percent change in productivity. If these increases were used in the calculations, the percent change in productivity would change accordingly.

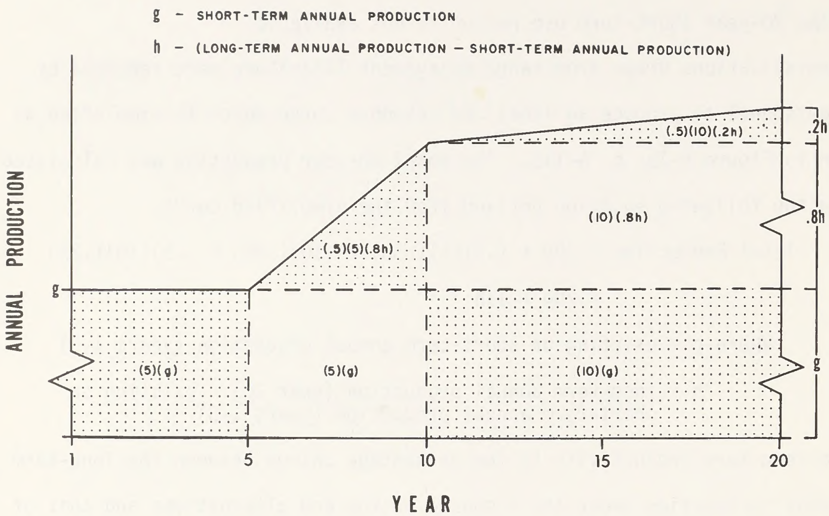


Figure A-19 Simplified Response Curve Showing Annual Production

GLOSSARY

G

AFFINITY. The relationship of a site to past cultural group(s) eg. Anasazi, Mogollon, etc.

AGGRADATION. The filling and raising of a streambed by deposition of sediment.

AGGREGATE. Structural units of soil. They are formed by the grouping of primarily soil particles into a secondary unit.

ALLOTMENT MANAGEMENT PLANS (AMP). A concisely written program of livestock grazing management, including supportive measures, if required, designed to attain specific management goals in an allotment.

ALLUVIUM. Materials transported and redeposited by water. (2 groups) (1) Local alluvium, like that found at the base of slopes, along small streams flowing from small drainage basins of nearly homogeneous rock and soil material, and (2) general alluvium of mixed origin, as along major stream courses.

ANASAZI. The prehistoric culture located in the plateau area of the Four Corners region.

ANIMAL UNIT (AU). One cow and calf (1,000 lbs.), one horse, one elk, five sheep, five goats, five deer or five antelope or the equivalent.

ANIMAL UNIT MONTH (AUM). The amount of forage required to sustain the equivalent of one cow and calf (1,000 lbs.), one horse, one elk, five sheep, five goats, five deer or five antelope for one month.

ANION. A negatively charged ion.

ANNUALS. Plants produced from seed which complete their life cycle in one growing season.

ARCHAIC. A cultural tradition generally following the Paleo-Indian tradition. At the end of this period, maize was introduced.

ARID. Climate characterized by insufficient rainfall to support agriculture, usually less than 10 inches annually.

ARTHROPODS. Invertebrate organisms in the phylum Arthropoda, including insects and arachnids.

ASPECT. The visual first impression of vegetation at a particular time or as seen from a specific point.

ASSOCIATION. A mapping unit used on generalized soil maps in which two or more defined taxonomic units occurring together in a characteristic pattern are combined.

AQUIFER. A water-bearing bed or stratum of permeable rock, sand, or gravel capable of yielding considerable quantities of water.

BARREN. A vegetative subtype which has little or no vegetation present.

BASALT. A dark-gray to black dense to fine grained igneous rock that consists of basic plagioclase augite; and usually magnetite with olivine for basalt glass.

BEDROCK. The solid rock underlying the soil and other unconsolidated materials or appearing at the surface where these are absent.

BOLSON. A flat-floored desert valley that drains to a playa.

BOSQUE. Dense growth of trees and underbrush, generally on the flood plain or adjacent to a stream or body of water.

BROWSE. As a verb, to consume, or feed or eat on woody plants; as a noun, the tender leaves, buds, and twigs of trees and shrubs often used as food by cattle, deer, elk, and other animals.

BROWSER. An animal that feeds on the leaves, buds, and twigs of woody plants.

CALCAREOUS SOIL. Soil containing sufficient free calcium carbonate or calcium-magnesium carbonate to effervesce visibly when treated with cold 0.1 N hydrochloric acid.

CALCIC HORIZON. A layer of secondary accumulation of carbonates, usually of C_a or M_g in excess of 15 percent calcium carbonate equivalent and contains at least 5 percent more carbonate than an underlying layer.

CALICHE. A layer near the surface, more or less cemented by secondary carbonates of calcium or magnesium precipitated from the soil solution. It may occur as a soft, thin soil horizon, as a hard, thick bed just beneath the solum, or as a surface layer exposed by erosion.

CARRY-OVER FORAGE. Ungrazed forage produced during the previous year.

CATION. A positively charged ion.

CFS. Cubic feet per second.

CHANNERY. In Scotland and Ireland, gravel; in the United States, thin, flat fragments of limestone, sandstone, or schist up to 6 inches in major diameter.

CLASS OF LIVESTOCK. Kinds of domestic livestock grazing on a range; cattle, horses, sheep or goats, or a combination of these. May be broken down to greater detail such as cows with calves, yearlings, steers, ewes, ewes with lambs, etc.

CLAY. A mineral soil separate consisting of particles less than 0.002 mm in equivalent diameter.

COARSE FRAGMENTS. Rock or mineral particles 2.0 mm in diameter.

COBBLES. Rounded or partially rounded rock or mineral fragments between 3 and 10 inches in diameter.

COLIFORM. A group of bacteria used as an indicator of sanitary quality in water. The total coliform group is an indicator of sanitary significance because the organisms are normally present in large numbers in the intestinal tracts of humans and other warm-blooded animals.

COMPLEX (Soil). A mapping unit in which two or more defined taxonomic units are so intimately intermixed geographically that it is undesirable or impractical, because of the scale being used, to separate them.

COMPONENT. The distinguishable evidence of a discrete occupation or use of that site by a group of people.

CONTINENTAL CLIMATE. The climate of areas where temperature extremes are wide because of lack of oceanic influence. Commonly occurs in the interior of large continents.

CONTRAST. The effect of a striking difference in the form, line, color, or texture of an area being viewed.

CONVECTIONAL THUNDERSTORMS. Storms that occur in the summer when the land surface becomes very hot under strong insolation and the lower strata of the atmosphere, in turn, heated considerably. Cumulus clouds are the upper ends of columns of overturned air formed by warm air projected upward to altitudes where it is chilled to the point of condensation. This phenomenon results in rains of high intensity, short duration and local distribution, usually accompanied by lightning (R. F. Daubenmire).

COOL-SEASON GRASS. A plant which makes the major portion of its growth during late winter, early spring, and again in the fall (during the cool seasons).

COVER. Small rocks, litter, basal areas of grass and forbs, and aerial coverage of shrubs that provide protection to the soil surface (i.e., in contrast to bare ground).

COVER, WILDLIFE. The plants or other objects used by animals for nesting, resting, escaping from predators or to avoid adverse environmental conditions.

COW-CALF OPERATION. A cattle business that sells weaned calves about 9 months of age.

COW-CALF-YEARLING OPERATION. A cattle business that sells weaned calves and yearlings.

CRITICAL WILDLIFE HABITAT. That portion of the living area of a wildlife species that is essential to the survival and perpetuation of the species either as individuals or as a population.

CYCLONIC OR FRONTAL STORMS. Storms that are caused by eddies of warm air several hundred miles in diameter; rising in vertical spirals above centers of low atmospheric pressure. As the ascending mass of air in a cyclone rises, it expands, mingles with cold air and, thereby, is greatly cooled. Precipitation results from this action and storms of this type are usually of long duration.

DECREASER. A plant species of the original vegetation that will decrease in relative abundance with continued overuse.

DENDRITIC. This is a stream drainage pattern where rock offers uniform resistance to weathering and erosion, thus, tributaries subdivide headward, like the limbs of a tree, with a main trunk-like stream and limb-like tributaries.

DENSITY. The number of hits on basal area of grass and forbs and aerial coverage of shrubs in a 100-step transect. The term is expressed as a percentage and actually represents the live plant component of cover.

DESIRABLE PLANTS. Plants which are palatable and productive forage species, often are dominant under or near climax conditions, are long-lived, and have deep fibrous roots to protect the watershed against erosion. This category includes the important key species (grasses, forbs, and browse) which are to be maintained or increased by intensive livestock management.

DIRECT INCOME. Income that can be charged to a specific source.

DOMESTIC CONSUMPTION. Steers used for consumption.

DRAWDOWN. The distance by which the groundwater surface level is lowered by pumping from a well.

DUNELAND. Consists of ridges and the intervening troughs made up of sand-sized particles that shift with the wind. It is devoid of vegetation.

EARTHEN RESERVOIR. A man-made earthen catchment for retaining runoff water for use by livestock and wildlife.

ENDANGERED OR THREATENED STATUS. Deter[illegible] plants and animals by any one or a combination of the following factors:

1. The present or threatened destruction, modification, or curtailment of its habitat or range;
2. Overutilization for commerical, sporting, scientific, or educational purposes;
3. Disease or predation;
4. The inadequacy of existing regulatory mechanisms; or,
5. Other natural or man-made factors affecting its continued existence.

ENDANGERED SPECIES - FEDERALLY LISTED. Any species of animal or plant in danger of extinction throughout all or a significant portion of its range. This definition excludes species of insects that the Secretary of the Interior determines to be pests and whose protection under the Endangered Species Act of 1973 would present an overwhelming and overriding risk to men.

ENDANGERED SPECIES - STATE (GROUP I). Species whose prospects of survival or recruitment in the state are in jeopardy.

ENDANGERED SPECIES - STATE (GROUP II). Species whose prospects of survival or recruitment within the state may become jeopardized in the foreseeable future.

ENDEMIC. Prevalent in, or restricted to, a particular area, region, or country.

EPHEMERAL STREAM. A stream that flows only briefly during and following a period of rainfall in the immediate vicinity.

ERODIBILITY. Being susceptible to erosion. (Expressed by such terms as highly erodible, slightly erodible, etc.)

EROSION. The wearing away of the land surface by running water, wind, ice, or other geological agents including such process as gravitational creep.

EVAPOTRANSPIRATION. Loss of water from the soil both by evaporation from the surface and by transpiration from the plants growing thereon.

EXCLOSURE. An area fenced to exclude animals.

FAULT BLOCKS. A mass bounded on at least two opposite sides by faults; it may be depressed or elevated relatively to the adjoining region.

FEDERAL LAND POLICY AND MANAGEMENT ACT OF 1976. Public Law 94-579 gives the Bureau of Land Management the legal authority to establish public land policy; to establish guidelines for its administration; to provide for the management, protection, development, and enhancement of the public lands; and for other purposes.

FLATS. A stretch of level ground.

FLOOD PLAIN. A plain built up or in the process of being built up by stream deposition.

FORAGE. Plants which are used as food by large herbivores such as cattle and large and small wildlife.

FORAGE ACRE. The number of acres in a specific area (such as a pasture or an allotment) that is completely covered by forage.

FORAGE ACRE REQUIREMENT (FAR). The number or fraction of forage acres necessary to support and maintain an animal for a specified period of time.

FORB. Herbaceous plants other than grass, such as clover.

GRAZING CAPACITY. The maximum stocking rate possible without inducing damage to vegetation or related resources. It may vary from year to year in the same area because of fluctuating forage production.

GRAZING PREFERENCE. The total number of animal unit months of livestock grazing on public lands apportioned and attached to base property owned or controlled by a permittee or lessee.

GRAZING SYSTEM. A systematic sequence of grazing use and non-use of an allotment to reach identified multiple use goals or objectives by improving the quality and quantity of the vegetation.

GROUND COVER (Soil) (Hydrologic). All material which covers the ground surface; includes live vegetation, dead vegetative material (litter), and small and large rocks.

GROUND COVER (Vegetation). Living vegetation which covers a point on the ground surface, when viewed from directly overhead, including canopies of trees and shrubs within 20 feet or less of the ground surface and lichens and mosses 1/16 inch or more in thickness.

GULLY EROSION. Removal of soil whereby the formation of relatively large channels or gullies cut into the soil by concentrations of runoff.

GYPSUM. A mineral consisting of hydrous calcium sulfate.

GYPSUM LAND. Consists of exposures of nearly pure soft gypsum. The surface is usually very unstable and erodes easily. The areas lack vegetation.

HEAVY USE. The proportion of current year's forage production that is eaten or destroyed by grazing animals ranges from 60-80 percent. See Utilization.

HOME RANGE (Wild Horses). The area over which an animal or group of animals travels in pursuit of routine activity. It implies a self-imposed restriction of movement.

HYDROLOGIC SOIL GROUPS.

A. Low runoff potential - These soils have high infiltration rates even when thoroughly wetted and consist chiefly of deep, well to excessively drained sands or gravels. These soils have a high rate of water transmission.

B. Soils having moderate infiltration rates when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

C. Soils having slow infiltration rates when thoroughly wetted and consisting chiefly of soils with a layer that impedes downward movement of water, or soils with moderately fine to fine textures. These soils have a slow rate of water transmission.

D. High runoff potential - Soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a clay pan or clay layer at or near the surface, and shallow soils over nearly impervious material.

INCLUSIONS (Soil). Any soil or soil material that falls outside of the named phase or the range of the named series in the mapping unit.

INCREASERS. Plants which increase as the vegetational composition deteriorates.

INDIRECT INCOME. Income derived that cannot be charged to a specific source.

INFILTRATION. The movement of water through the soil surface into the soil.

INTERMEDIATE PLANTS. Plants of secondary importance in the climax condition. They replace the desirable plants, as condition deteriorates, and replace the least desirables as condition improves. They may be less desirable to grazing animals or be more resistant to grazing use.

INTERMINGLED LAND. A large block of land composed of fragments or parcels of public, State and private land.

INTERMITTENT STREAM. Flows at least 30 consecutive days during certain times of the year.

INTRUSION. Feature (land, vegetation, or structure) which is generally considered out of context with the characteristic landscape.

INTRUSIVES. Denoting igneous rocks in a molten state which have evaded other rock formations and cooled below the surface of the earth.

INVADERS. Plants which invade or occupy open space resulting from the loss of other longer lived plants.

JORNADA MOGOLLON. A branch of the Mogollon culture area. The Mogollon were located in southwestern New Mexico and lapped into Arizona and Mexico.

KEY AREA. A portion of range, which, because of its location, grazing or browsing value, and/or use, serves as an indicative sample of range conditions, trend or degree of use seasonally.

KEY FORAGE SPECIES. Relatively or potentially abundant, endures moderately close grazing, and serves as an indicator of changes occurring in the vegetative complex. This species is an important vegetative component that, if overused, will have significant effect on watershed condition, grazing capacity, or other resource values. Other forage species having growth requirement equal to or less than the key species will be maintained by the rest.

KEY SPECIES. Forage species whose use serves as an indicator to the degree of use of associated species.

LAMINAR FLOW. Non-turbulent flow of a fluid near a boundary.

LANDSCAPE CHARACTER. The arrangement of a particular landscape as formed by the variety and intensity of the four basic elements of form, line, color, and texture.

LIFE ZONE. A classification of flora and fauna based on elevation and latitude.

LIGHT USE. The preparation of current year's forage production that is eaten or destroyed by grazing animals ranges from 20-40 percent. See Utilization.

LIMESTONE. A sedimentary rock consisting chiefly (more than 50 percent) of calcium carbonate, primarily in the form of calcite.

LITHIC. A stone or rock exhibiting modification by humans. It generally applies to projectile points, scrapers, chips, etc., rather than ground stone.

LITTER. A surface layer of loose organic debris consisting of freshly fallen or slightly decomposed organic materials.

LIVESTOCK OPERATION. The type of cattle business such as: cow-calf operations, yearling operations, or cow-calf-yearling operations.

LIVESTOCK OPERATOR. A person who operates a livestock business.

LLANO. A large, grassy, almost treeless plain as found in Latin America or the southwestern United States.

LOAM. Soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

MAGNITUDE OF CONTRAST. A classification of intrusions as to the degree which they have modified or intruded upon the natural landscape.

MANAGEMENT FRAMEWORK PLAN (MFP). Land use plan for public lands which provides a set of goals, objectives, and constraints for a specific planning area to guide the development of detailed plans for the management of each resource.

MAPPING UNIT. One or more soil series and inclusions used to describe a soil delineation (i.e., soil associations, consociations, and complexes).

MESA. An isolated hill or mountain having abrupt or steeply sloping sides and a level top that is composed of a resistant nearly horizontal stratum of rock.

MESOZOIC. A geologic time unit from about 230 to 63 million years ago; it comes after the Paleozoic era and before the Cenozoic era.

METASEDIMENTS. Partly metamorphosed sedimentary rocks.

MODERATE USE. The proportion of current year's forage production that is eaten or destroyed by grazing animals ranges from 40-60 percent. See Utilization.

MOISTURE REGIMES. Areas with or of different soil saturation levels. Areas with different amounts of available ground water (water held at a tension of 15 bars).

NATIONAL REGISTER. The National Register of Historic Places, which is a register of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture maintained by the Secretary of the Interior.

NET RETURNS. Whatever remains from earnings and profits after all costs, expenses and allowances for depreciation have been deducted.

OFF-ROAD VEHICLE (ORV). Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other terrain.

OVERLAND FLOW. Non-channel surface runoff. Also called sheetflow. (Also, see surface runoff.)

OVERGRAZING. Consumption of vegetation by herbivores beyond the endurance of a plant to survive.

OVERSTOCKING. A condition in which an area is occupied by more than the optimum number of livestock (wildlife, trees, etc.).

OVERSTORY. The upper canopy or canopies of plants.

PACE POINT TRANSECTS. A method of estimating the vegetative ground cover which occurs on a predetermined transect line. A notch 1/8-inch wide and 1/16-inch deep is made on the sole of the toe of the boot. As that toe touches the ground, whatever is under or above the notch is recorded, i.e., live vegetation (species), litter (dead vegetative material) rock and bare ground.

PALEO-INDIAN. Cultural remains of human groups which coexisted with Pleistocene megafauna in North America.

PALEOZOIC. Geologic time unit, about 600 to 230 million years ago.

PASTURE. As used in this document, a pasture is a subdivision of a grazing allotment on public lands.

PERCOLATION. Downward movement of water through soils.

PERENNIAL PLANT. A plant that has a life cycle of 3 or more years.

PERENNIAL STREAM. A stream that flows continuously during all seasons of the year.

PERMEABILITY. The measure of the capacity for transmitting a fluid through the substance.

PETROCALCIC HORIZON. A continuous indurated calcic horizon that is cemented by calcium carbonates and, in some places, with magnesium carbonates. Cannot be penetrated with a spade, is impenetrable by roots.

PHENOLOGY. A term used to describe the sequence of events and time of occurrence of the life processes of a plant, i.e., start of growth, bloom stage, seed ripe stage, dormant stage.

PIRO. A branch of the Anasazi. These people were the first Anasazi people encountered by the Spanish conquistadores.

PLANT VIGOR. The relative well-being and health of a plant as reflected by its ability to manufacture sufficient food for growth and maintenance.

PRECAMBRIAN. That portion of geologic time before 600 million years ago.

PROCUREMENT/PROCESSING LOCI. Areas of subsistence and other resource extraction or processing activities.

PUBLIC LANDS. Lands administered by the Bureau of Land Management and owned by the public.

PUEBLO. Of, or relating to, a culture of the plateau area of the Southwestern U.S.

PROPER USE FACTOR (PUF). The average weight percentage of a particular plant specie in relation to all other species that can be safely grazed without restricting forage capacity production.

RANGE CONDITION. The present state of the plant community on a range site in relation to the potential natural plant community for that site.

RANGE CONDITION CLASS. One of a series of arbitrary categories used to classify range condition, usually expressed as either excellent, good, fair, or poor in this report.

RANGE CONDITION CLASS (continued). Four classes are used to express the degree to which the composition of the present plant community reflects that of the climax. They are:

Range Condition Class	Percentage of present plant community that is climax for the range site
Excellent	76-100
Good	51-75
Fair	26-50
Poor	0-25

RANGE SITE. A distinctive kind of rangeland that differs from other kinds of rangeland in its potential to produce native plants.

RANGE TREND. The direction of change in range condition.

RANGE TYPE. A mapping unit used in range surveys. It is a relatively homogenous classification unit on the basis of the following criteria:

abundance of vegetation
species composition
slope
exposure
kind of soil
erosion.

RECHARGE. The natural replenishment of groundwater storage by infiltration of surface water.

RECREATION RESOURCES. Any natural or cultural resource or feature that contributes to a recreation experience.

RETENTION. Having the capability or capacity to retain, as soil water in soils.

RETROGRESSION. The process whereby the same area becomes successively occupied by different plant communities of lower ecological order.

RILL EROSION. Removal of soil through the cutting of numerous small, but conspicuous water channels that are minor concentrations of runoff.

RIO GRANDE RIFT. The valley formed by down-thrown fault blocks, and filled by sediments eroded from the bordering upthrown fault blocks in which the Rio Grande flows in southern New Mexico.

RIPARIAN VEGETATION. Vegetation which occurs in or adjacent to drainage ways and/or their floodplains and which is further characterized by species and/or like forms different from that of the adjacent nonriparian vegetation.

ROADLESS AREAS. A contiguous tract of public land which is 5,000 acres or greater and is bounded by a road and/or land ownership change (non-BLM).

ROCK UNITS. Stratographic units defined and identified by lithologic or structural features without regard to fossils or time boundaries.

RUN-IN. Areas receiving moisture in addition to direct rainfall.

RUNOFF. A general term used to describe the portion of precipitation on the land that ultimately reaches streams; may include channel and non-channel flow.

SACRIFICE AREAS. Areas generally receiving 80 percent or more livestock utilization every year.

SALINITY. Saline soil, condition of - an unalkaline soil containing sufficient soluble salts to impair its productivity.

SAND. Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 mm. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and less than 10 percent clay.

SANDSTONE. A sedimentary rock containing predominately sand-size clastic particles, usually consists of quartz more or less firmly united by some cement (as silica, iron oxide, or calcium carbonate) and that varies in color, being commonly red, yellow, brown, gray, or white.

SCENIC QUALITY. The degree of harmony, contrast, and variety within a landscape.

SECTION. One square mile or 640 acres.

SECTION 4 PERMIT. A permit issued by BLM for the licensee to construct a project on public lands. The project must be built to BLM specifications. The licensee has the sole interest in the project on public lands, including maintenance.

SEDIMENT. Solid, clastic material, both mineral and organic, that is in suspension, is being transported or has been moved from its site of origin by water, wind, or ice and has come to rest on earth's surface, either above or below sea level.

SEMIARID. Climate characterized by light rainfall and high evaporation, the growth of short grasses, and dry farming of limited yield; having from 10 to 20 inches of annual precipitation.

SHEET EROSION. More or less uniform removal of soil from an area without the development of conspicuous water channels.

SHEETFLOW. See Overland Flow.

SILT. Sedimentary material consisting primarily of mineral particles intermediate in size between sand and clay.

SLOUGH. To be shed or cast off.

SOIL. (i) The unconsolidated mineral material on the immediate surface of the earth that serves as a natural medium for the growth of land plants. (ii) The unconsolidated mineral matter of the surface of the earth that has been influenced by genetic and environmental factors including parent material, climate, topography, all acting over a period of time and producing soil that differs from the parent material in physical, chemical, biological, and morphological properties and characteristics.

SOIL DEPTH.

	Lower Boundary Inches
Very Shallow	Less than 12
Shallow	12-20
Moderately Deep	20-36
Deep	36-40
Very Deep	More than 40

SSF. The abbreviation for Soil Surface Factor. The SSF, as computed through the use of BLM Form 7310-12, is an expression of current erosion activity. Seven categories of surface features are considered by the field man in the examination of the area represented by a Transect. Both wind and water are considered for each category. The categories are: soil movement, surface litter, surface rock, pedestalling, rills, flow patterns, and gullies. Numerical values are assigned to each category and are totaled to determine the SSF. The value of the SSF determines the erosion condition class of the transect area. Also, see erosion condition.

SOIL SERIES. A group of soils having genetic horizons that, except for texture of the surface layer, have similar characteristics and arrangement in the profile.

SOIL TEXTURE. The relative proportions of the various soil separates, sand, silt, and clay.

SOLUM. The solum may be defined simply as the genetic soil developed by soil-building forces. In normal soils, the solum includes the A and B margins or the upper part of the soil profile above the parent material.

SONORAN. Relating to, or being the arid division of the biographic zone that includes the warmer parts of the western U. S. and central Mexico.

SPRING. A flow of water from the ground; the source of a stream.

STAGE. The height of the surface of a river above an arbitrary zero point.

STORM.

2-Year Storm. Volume and intensity of a storm that could be expected to happen once in 2 years.

5-Year Storm. Volume and intensity of a storm that could be expected to happen once in 5 years.

10-Year Storm. Volume and intensity of a storm that could be expected to happen once in 10 years.

25-Year Storm. Volume and intensity of a storm that could be expected to happen once in 25 years.

SUBSOIL. Refers to the B horizon of soil with distinct profiles. In soils with weak profile development, subsoil can be defined as the soil below the surface soil in which roots normally grow or in terms of arbitrary depths.

SUBSTRATUM. Is on layer beneath the solum, either conforming (C) or unconforming (D).

SURFACE RUNOFF. Water that travels over the ground surface to a channel.

SWALE. A tract of low and sometimes wet land.

TALUS SLOPES. Slopes formed by the accumulation of rock debris.

TERM PERMITS. An authorization for livestock grazing of public lands, and other lands under BLM control, for a certain length of time (not to exceed 10 years).

TERRITORIES (Primary Wild Horse Use Areas). An area with a high concentration of horse activity which is clearly marked with scent or visual markings (stud piles) to deter other males from encroachment.

TERTIARY. Of, or relating to, the time interval between the close of the Mesozoic era and the beginning of the Quaternary period from about 63 to 2 million years ago.

TEXTURE (Soils). The relative proportions of various soil separates, sand, silt, and clay.

THREATENED SPECIES. Any species likely to become endangered within the foreseeable future throughout all or a significant part of its range.

TILTH. The physical condition of soil as related to its ease of tillage, fitness, as a seedbed and its impedance to seedling emergence and root penetration.

TRANSITION ZONE. The life zone which extends from about 7,000 to 9,500 feet elevation. The major flora characterizing life zone is ponderosa pine.

UNDERFLOW. An underground stream or movement of water.

UNDERSTORY. The plants growing beneath the canopy of other plants.

UNIT HYDROGRAPH. A graph of streamflow versus runoff for a 1-inch storm of a given duration.

UPPER SONORAN LIFE ZONE. The life zone which extends from about 4,500 to 8,000 feet elevation. The major flora characteristic of this life zone is pinyon-juniper.

UTILIZATION. The proportion of current years' forage production that is eaten or destroyed by grazing animals, usually expressed as a percentage. In this report:

Sacrifice	=	80-100 percent
Heavy	=	60-80 percent
Moderate	=	40-60 percent
Light	=	20-40 percent
Slight	=	0-20 percent

VEGETATION TYPE. A plant community with distinguishable characteristics.

VEGETATIVE COMPOSITION. Percentage of vegetation occupied by each species.

VEGETATIVE SUBTYPE. A subdivision of a vegetative type which generally indicates an aspect to the viewer of either a single dominant species, or dominant species, similar in appearance (i.e., vegetative type = conifer; vegetative subtype = ponderosa pine; vegetative type = grass; vegetative subtypes = shortgrass, tallgrass, etc.).

VIEWING DISTANCE. The distance between the viewer and the resource being viewed as used in BLM's Visual Resource Management System. Distances are defined as visual zones: a. Foreground - Middle Ground - 3 to 5 miles. b. Background-5 miles to loss of resource visibility in the distance. c. Seldom Seen - Resource which cannot be seen from viewpoint.

VIGOR (Plants). The state of health of a plant. The capacity of a plant to respond to growing conditions, to make and store food, produce food, produce seed, or reproduce vegetatively, that is, by stolons or rhizomes.

VISUAL RESOURCE. The land, water, vegetative, animal, and other features that are visible on all public lands.

VISUAL SENSITIVITY. An index of the relative importance of value of visual response to an area in relation to other areas in the planning unit.

VISUAL ZONES. The area that can be seen as foreground, middleground, background, or seldom seen.

VOLCANIC FLOWS. Material ejected, in various forms, during volcanic activity which leaves deposits after flowing in horizontal, or near horizontal beds.

VOLCANIC PLUG. The solidified material (basalt) filling a vent or pipe of a dead volcano.

WARM SEASON GRASS. A plant which makes most, or all of its growth during the spring, summer or fall and is usually dormant in winter; grows during the warm seasons.

WELL. A deep hole or shaft sunk into the earth to tap an underground supply of water, gas, oil, etc.

WIND ERODIBILITY GROUP (WEG). A group of soils having the same potential for soil blowing.

XERIC. A soil moisture regime common to Mediterranean climates that have moist-cool winters and warm-dry summers.

YEARLING OPERATION. A cattle business that sells cattle at the age of 18 to 24 months old.

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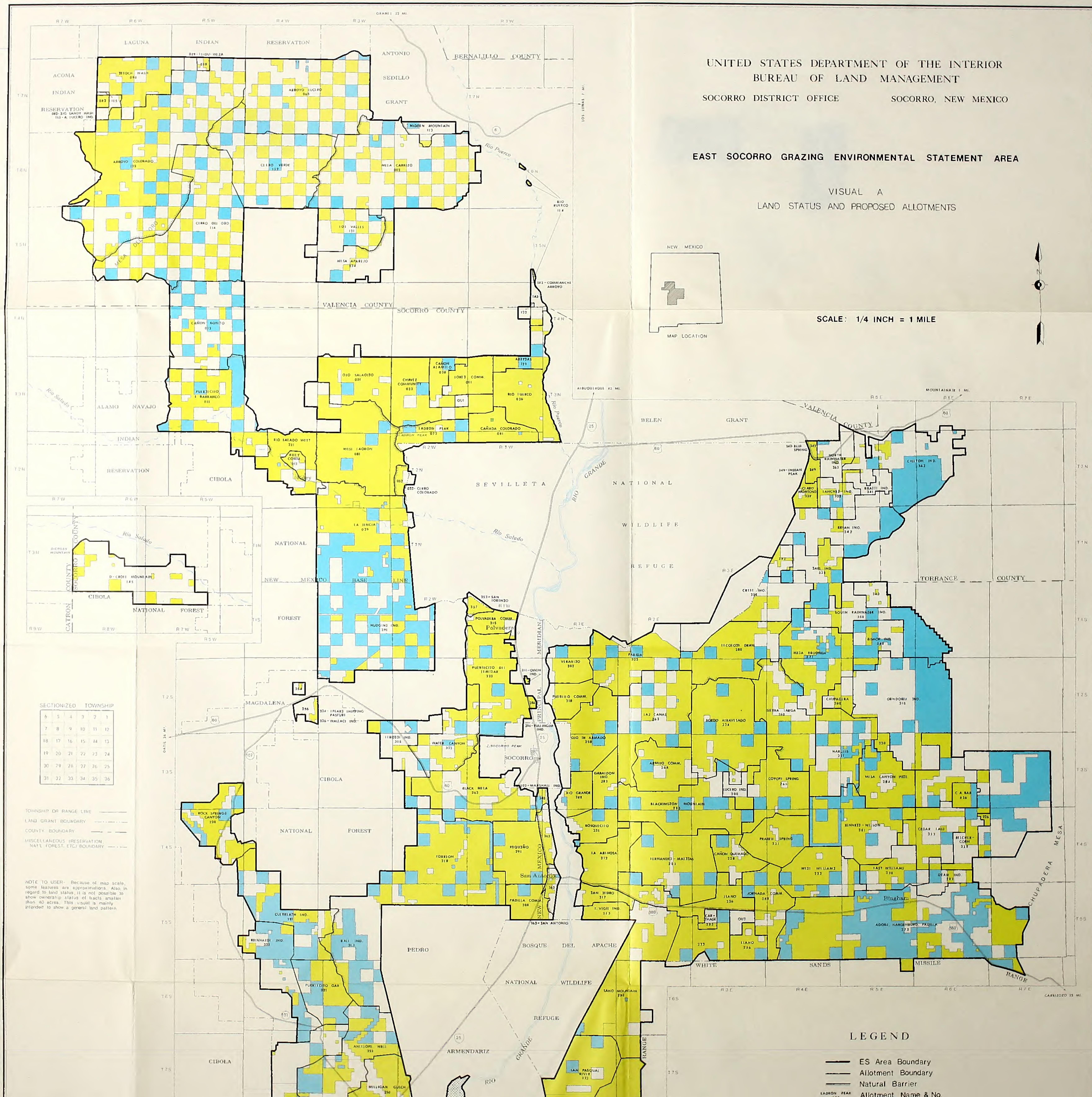
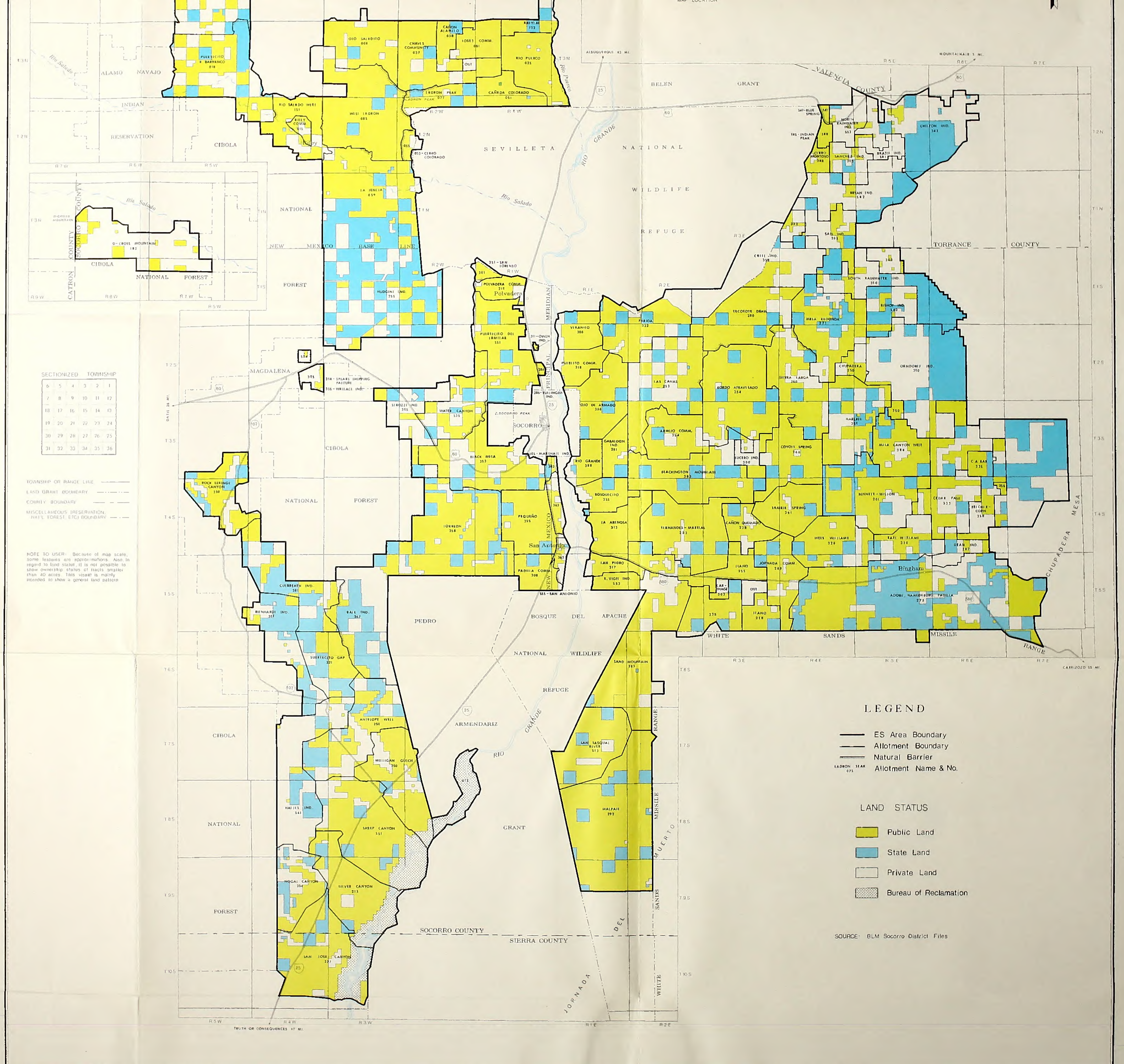

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SOCORRO DISTRICT OFFICE
SOCORRO, NEW MEXICO
EAST SOCORRO GRAZING ENVIRONMENTAL STATEMENT AREA
VISUAL A
LAND STATUS AND PROPOSED ALLOTMENTS
NEW MEXICO
MAP LOCATION
SCALE: 1/4 INCH = 1 MILE
SECTIONIZED TOWNSHIP
TOWNSHIP OR RANGE LINE
LAND GRANT BOUNDARY
COUNTY BOUNDARY
MISCELLANEOUS (RESERVATION, NAT'L FOREST, ETC.) BOUNDARY
NOTE TO USER: Because of map scale, some features are approximations. Also, in regard to land status, it is not possible to show ownership status of tracts smaller than 40 acres. This visual is mainly intended to show a general land pattern.
LEGEND
ES Area Boundary
Allotment Boundary
Natural Barrier
Allotment Name & No.
VALENCIA COUNTY
SOCORRO COUNTY
BERNALILLO COUNTY
TORRANCE COUNTY
SEVILLETA NATIONAL WILDLIFE REFUGE
BOSQUE DEL APACHE NATIONAL WILDLIFE REFUGE
WHITE SANDS MISSILE RANGE
CIBOLA NATIONAL FOREST
NEW MEXICO BASE LINE
NEW MEXICO PRINCIPAL MERIDIAN
Rio Puerco
Rio Salado
RIO GRANDE
SOCORRO
San Antonio
Polvadera
Bingham
CHUPADERA MESA



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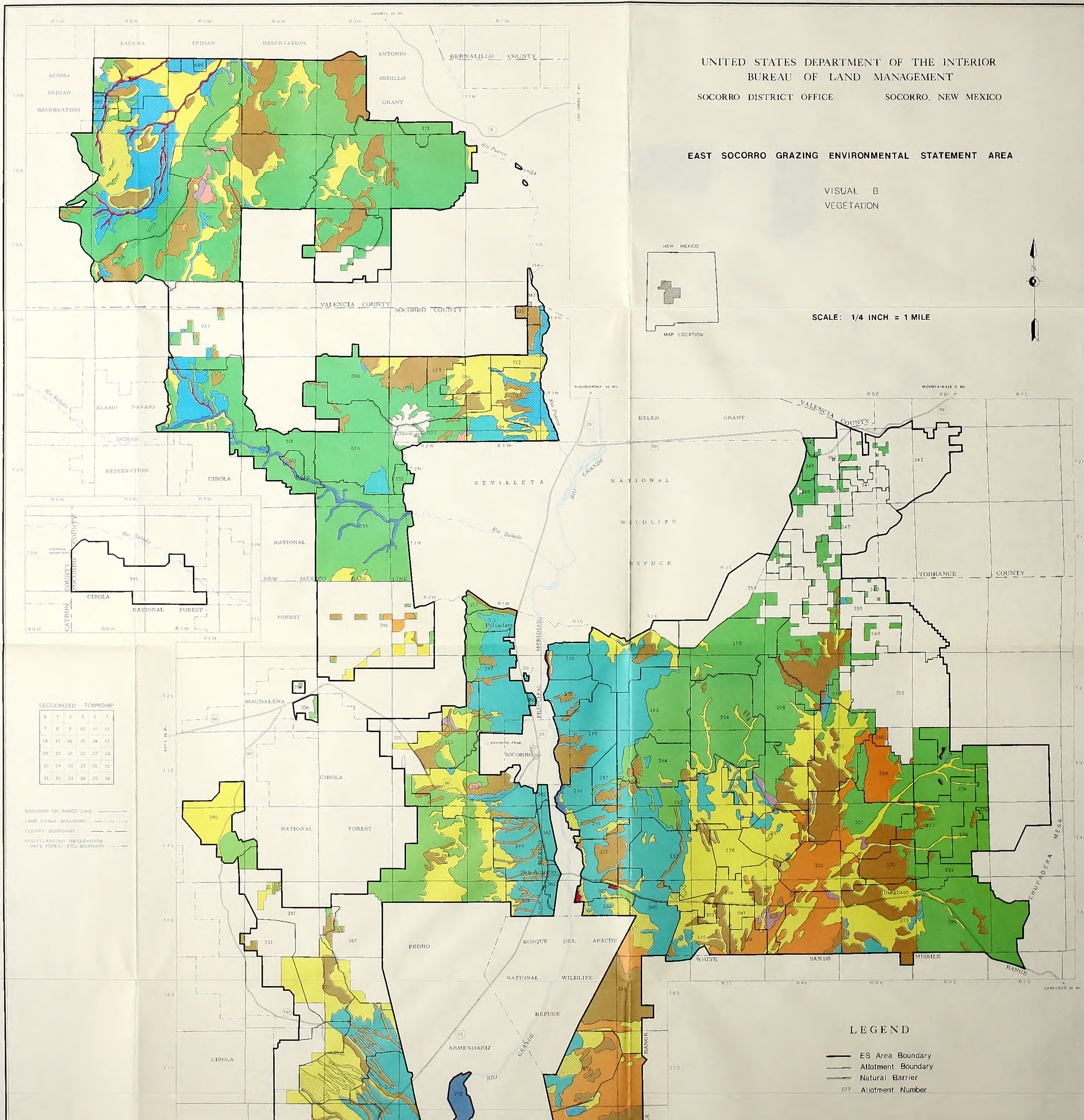
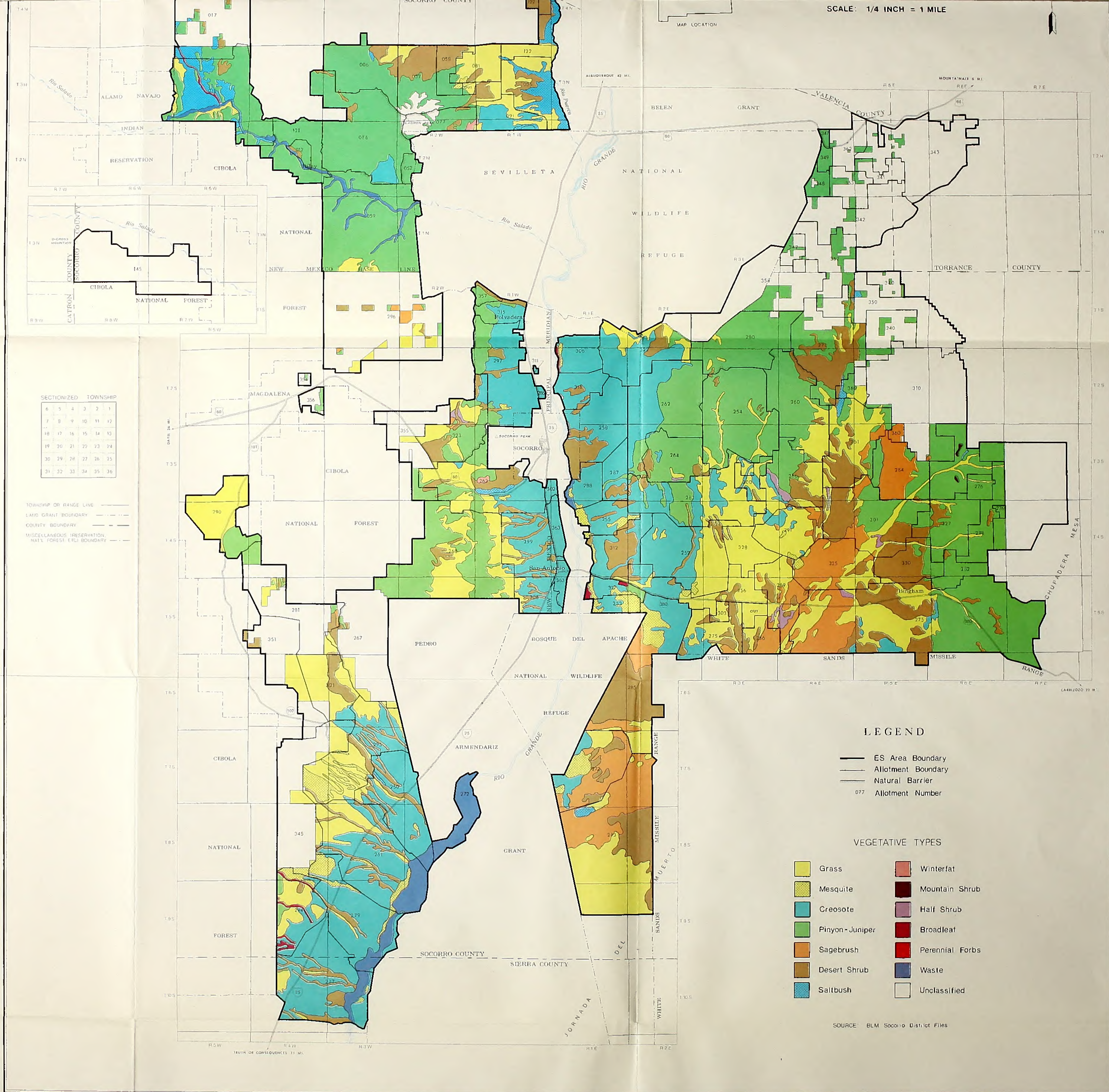


UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SOCORRO DISTRICT OFFICE
SOCORRO, NEW MEXICO
EAST SOCORRO GRAZING ENVIRONMENTAL STATEMENT AREA
VISUAL B
VEGETATION
NEW MEXICO
MAP LOCATION
SCALE: 1/4 INCH = 1 MILE
LEGEND
ES Area Boundary
Allotment Boundary
Natural Barrier
077 Allotment Number
SECTIONIZED TOWNSHIP
TOWNSHIP OR RANGE LINE
LAND GRANT BOUNDARY
COUNTY BOUNDARY
MISCELLANEOUS (RESERVATION, NAT'L FOREST, ETC) BOUNDARY
LAGUNA INDIAN RESERVATION
ACOMA INDIAN RESERVATION
ANTONIO SEDILLO GRANT
BERNALILLO COUNTY
VALENCIA COUNTY
SOCORRO COUNTY
ALAMO NAVAJO INDIAN RESERVATION
CIBOLA NATIONAL FOREST
SEVILLETA NATIONAL WILDLIFE REFUGE
BELEN GRANT
TORRANCE COUNTY
NEW MEXICO BASE LINE
PRINCIPAL MERIDIAN
MAGDALENA
SOCORRO
Polvadera
San Antonio
Bingham
BOSQUE DEL APACHE NATIONAL WILDLIFE REFUGE
PEDRO ARMENDARIZ
WHITE SANDS MISSILE RANGE
CHUPADERA MESA
Rio Puerco
Rio Salado
RIO GRANDE
CATRON COUNTY



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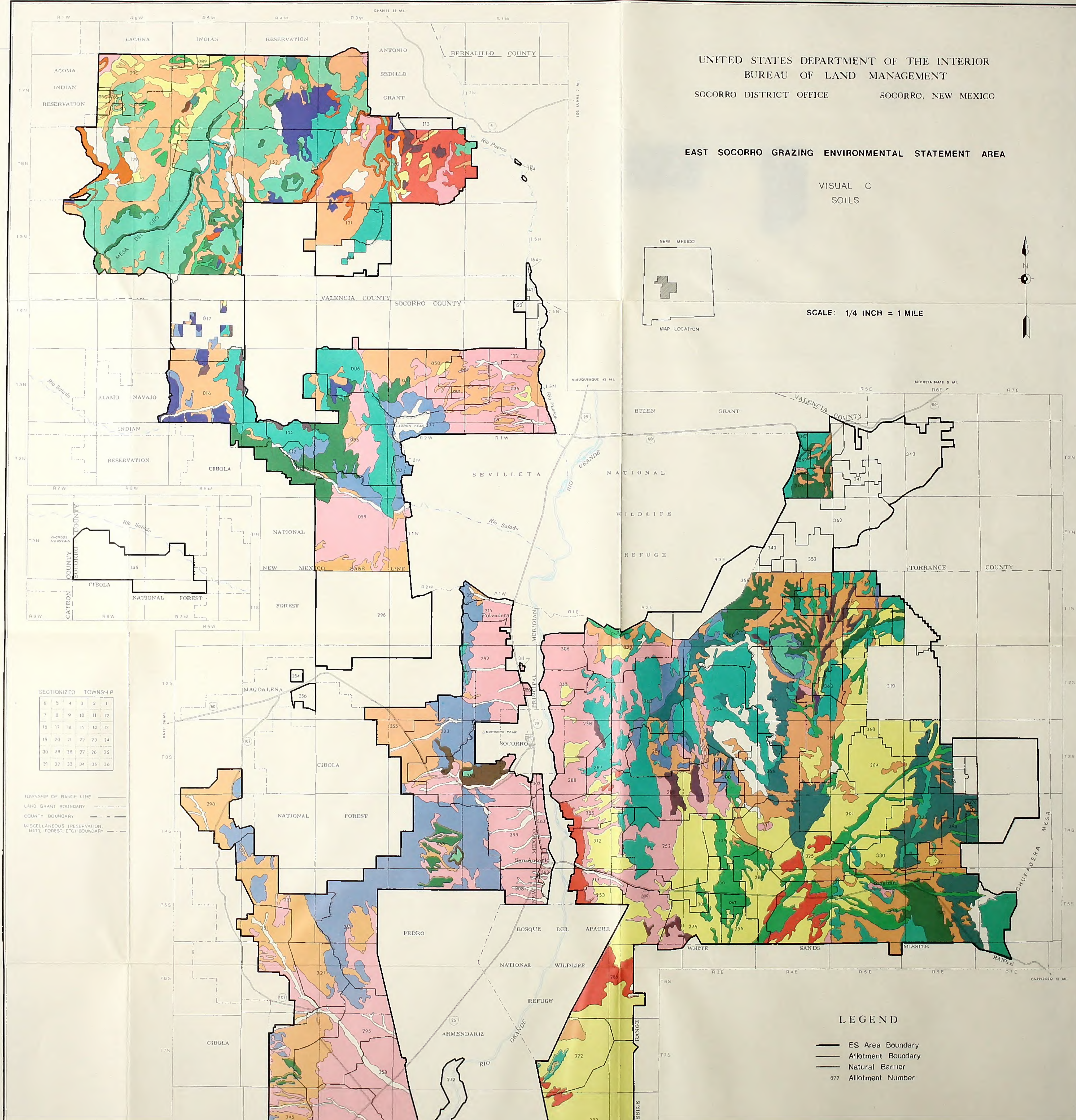

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SOCORRO DISTRICT OFFICE
SOCORRO, NEW MEXICO
EAST SOCORRO GRAZING ENVIRONMENTAL STATEMENT AREA
VISUAL C
SOILS
NEW MEXICO
MAP LOCATION
SCALE: 1/4 INCH = 1 MILE
N
LEGEND
ES Area Boundary
Allotment Boundary
Natural Barrier
077 Allotment Number
SECTIONIZED TOWNSHIP
TOWNSHIP OR RANGE LINE
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COUNTY BOUNDARY
MISCELLANEOUS (RESERVATION, NAT'L FOREST, ETC) BOUNDARY
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ACOMA INDIAN RESERVATION
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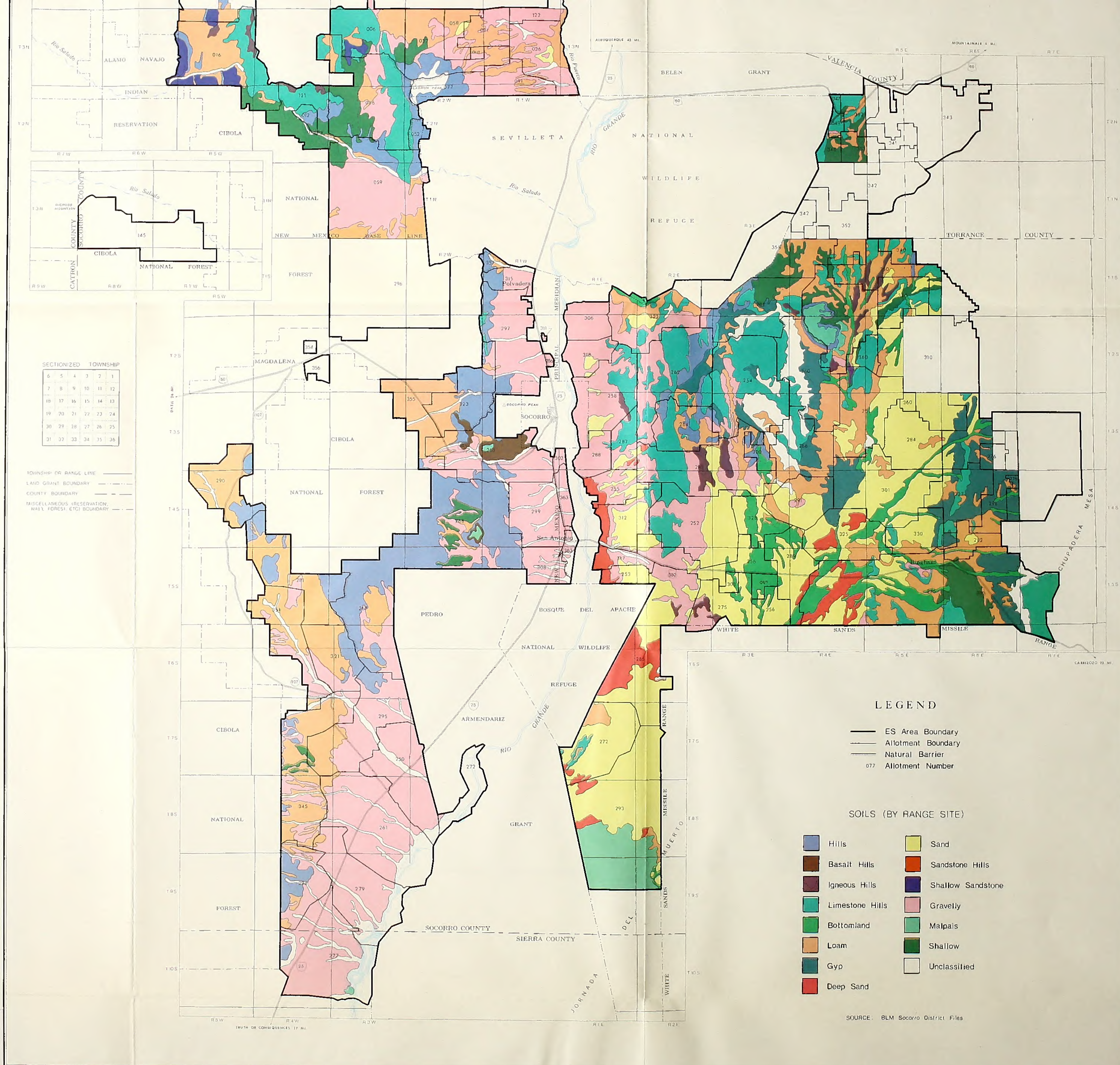
BERNALILLO COUNTY
VALENCIA COUNTY
SOCORRO COUNTY
TORRANCE COUNTY
CATRON COUNTY
ALAMO NAVAJO INDIAN RESERVATION
CIBOLA
CIBOLA NATIONAL FOREST
SEVILLETA NATIONAL WILDLIFE REFUGE
BELEN GRANT
NEW MEXICO BASE LINE
PRINCIPAL MERIDIAN
MAGDALENA
Polvadera
SOCORRO
San Antonio
Bingham
BOSQUE DEL APACHE NATIONAL WILDLIFE REFUGE
PEDRO ARMENDARIZ
WHITE SANDS MISSILE RANGE
CHUPADERA MESA
Rio Puerco
Rio Salado
RIO GRANDE
MESA DEL ORO



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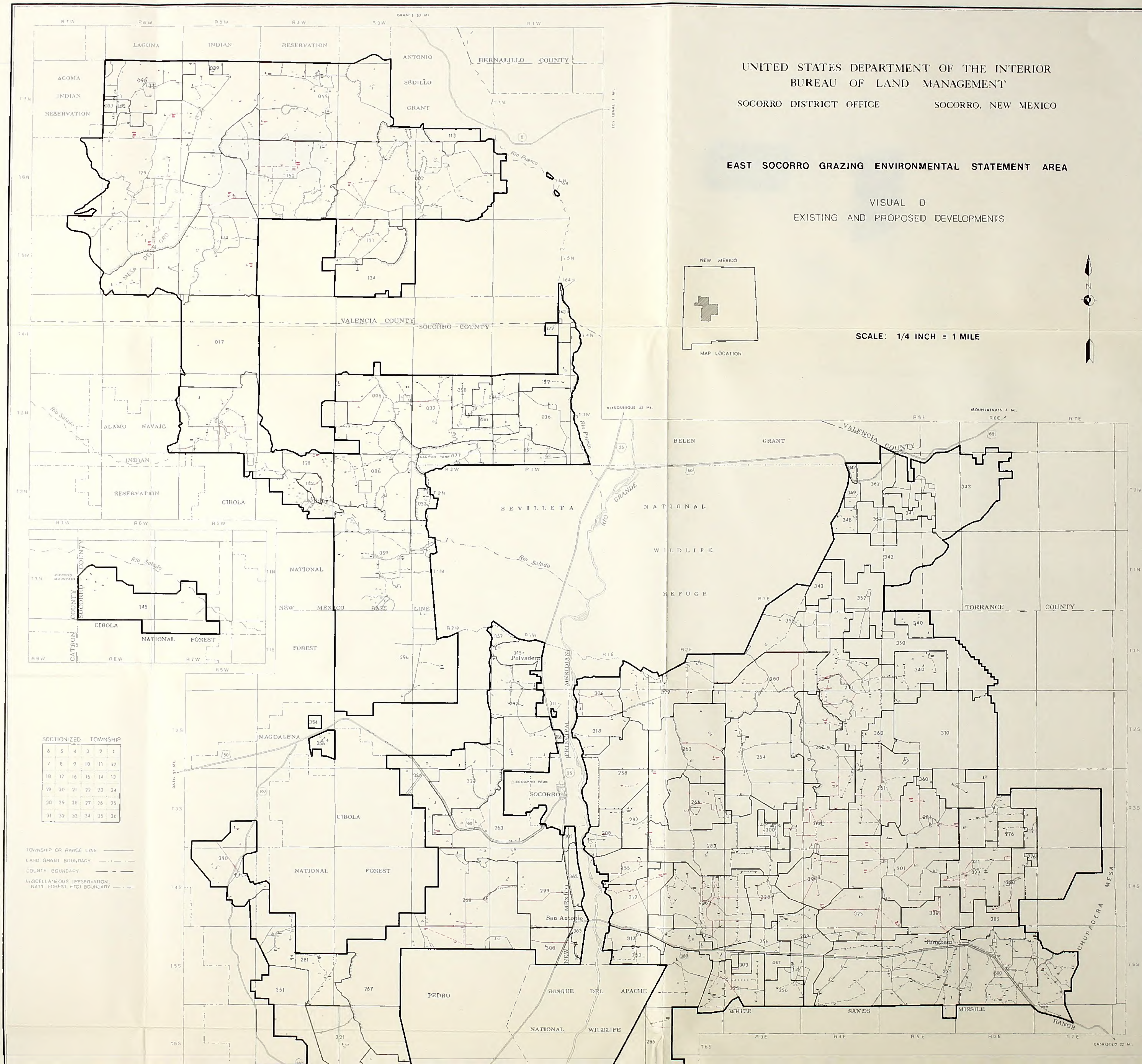
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SOCORRO DISTRICT OFFICE
SOCORRO, NEW MEXICO
EAST SOCORRO GRAZING ENVIRONMENTAL STATEMENT AREA
VISUAL D
EXISTING AND PROPOSED DEVELOPMENTS
NEW MEXICO
MAP LOCATION
SCALE: 1/4 INCH = 1 MILE
SECTIONIZED TOWNSHIP
TOWNSHIP OR RANGE LINE
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BELEN GRANT
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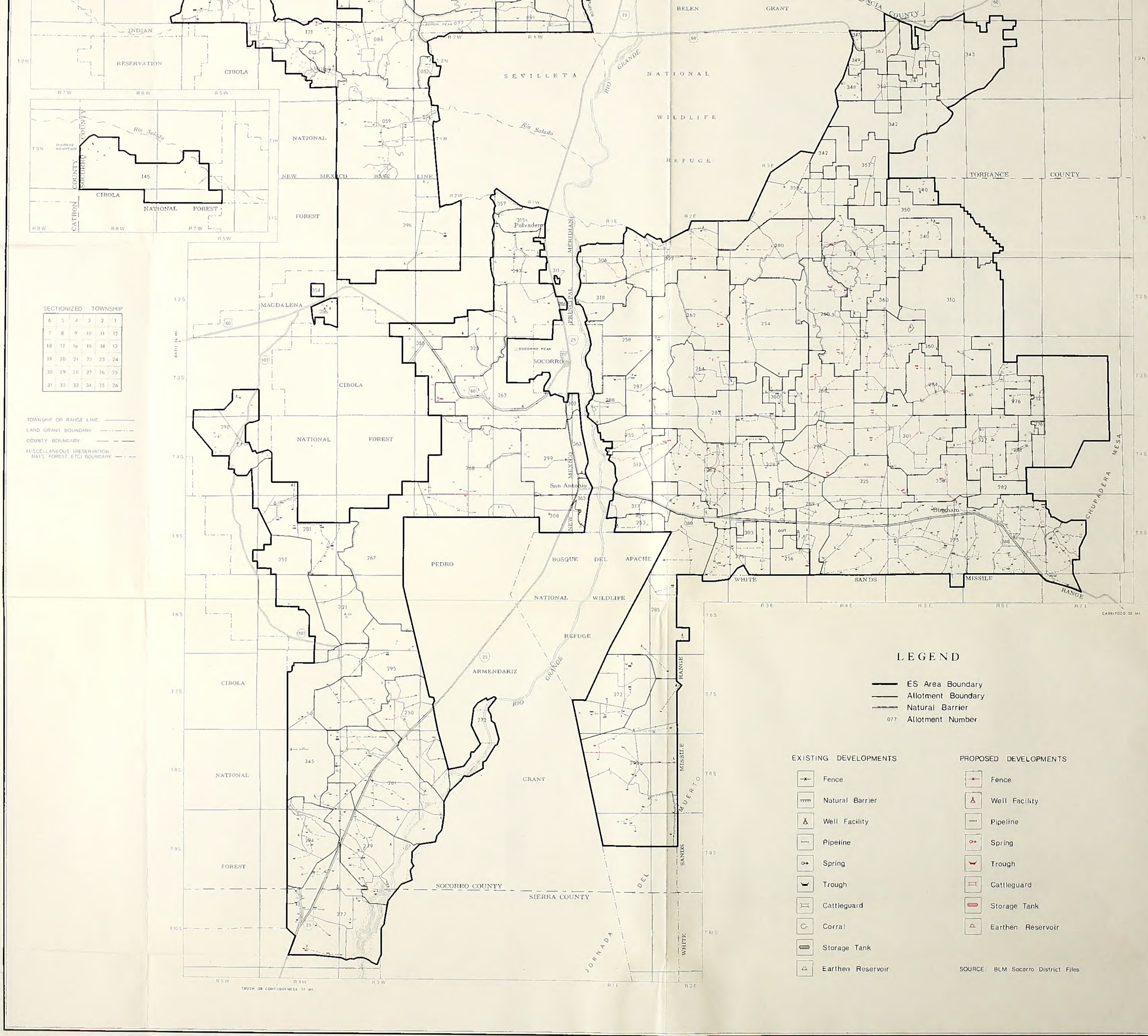
Polvadera
SOCORRO
San Antonio
Bingham
MAGDALENA
BOSQUE DEL APACHE NATIONAL WILDLIFE
PEDRO
WHITE SANDS MISSILE RANGE
CHUPADERA MESA
Rio Puerco
Rio Salado
RIO GRANDE



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